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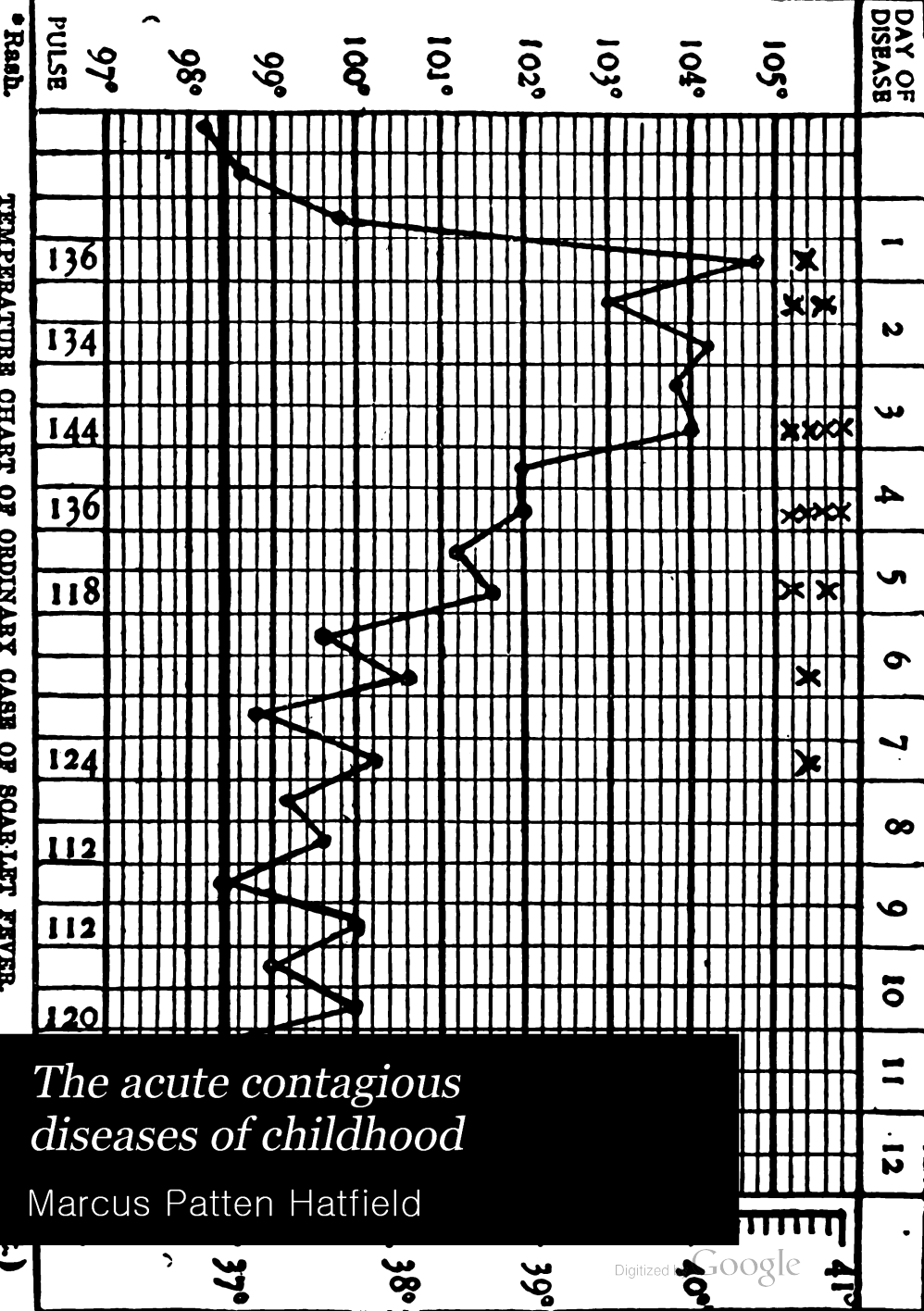
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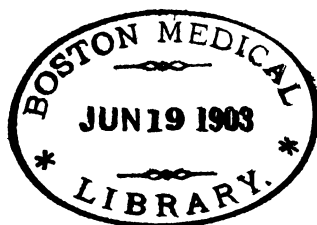
The Acute Contagious Diseases of Childhood

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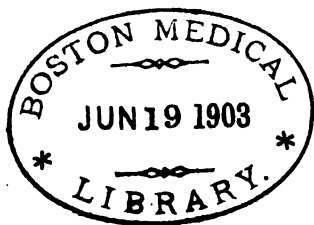
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PREFACE.

This little book lays no claim to original work by its writer. It is, as is very apparent, a "composite" of the various writers on the subjects discussed, especial pains having been taken to embody the views of later French and German pediatricians. If it has succeeded in doing this succinctly, clearly and to the help of those who read it, it has accomplished whereunto it was sent; if it has failed, the compiler has honestly endeavored to make it worth the reading.

M. P. H.



CHAPTER I. SCARLATINA.

SYNONYMS.—Scarlet fever, Scharlach, Scarlatine, Febris Scarlatina, Fire Measles (Morbilli ignei), "Rubeolas."

VARIETIES.—*S. simplex*, *S. miliaris*, *S. papulosa*, *S. pemphigoides*, *S. petechialis*, *S. maligna*, *S. sine angina*, *S. foudroyant*, *S. levigata*.

DEFINITION.—A self-limited, contagious microbic disease, characterized by fever, angina and a typical eruption, followed by desquamation.

OCCURRENCE.

At present epidemic in all the larger American cities, but varying greatly from year to year in percentage and mortality. According to Busey it is the most widely disseminated of the exanthemata of childhood and, next to diphtheria, most uncertain in its prognosis. It is emphatically a child's disease, since 64 per cent of all cases are found in children under six years of age (Murchison). As a rule children under six months escape, though one of two days is reported as having contracted the disease (Archives of Pediatrics, 1899). No age is immune from the disease unless protected by a previous attack, but because one has safely passed through a half a dozen epidemics is no proof that he will escape

the seventh, although the exposure is apparently exactly the same as that of previous years.

The reason for this variable susceptibility is not yet understood; 42 per cent of the children in a village where scarlatina had never previously appeared escaped without any attempt being made to isolate the sick (Budert); while in other epidemics not a child will escape who has been exposed to the contagion. Colored children are not immune, though so reported by a recent writer. Both sexes are equally liable.

SECOND ATTACKS AND RELAPSES.

As a rule one attack protects from a second. Personally I have never seen a typical second attack and am inclined to believe that the majority of such reported cases are due to errors in diagnosis. Recrudescence of the disease or relapses as late as the third or fourth week are by no means uncommon, and are not inexplicable by the microbic theory of scarlet fever. Possibly the repeated anginas of nurses caring for scarlet fever patients should be regarded as abortive cases of scarlatina sine exanthema.

MORTALITY.

The latest figures on this subject are those of McCullum, who reports the hospital mortality of Boston for the past seven years as 9.8 per cent, which is greater than the reported mortality of scarlet fever during the

same period in Liverpool, Glasgow, London, Berlin, Paris, Brooklyn, New York, Philadelphia, or St. Louis, except for the year 1896, when that of New York City was slightly higher.

The average yearly mortality from scarlet fever in the city of Chicago, from 1851 to 1898 inclusive, has been 3.11 per hundred deaths from all causes. In 1858 and 1859 there were epidemics in which the mortality reached 10.4 per cent and 12.6 per cent; since that time there has been a progressive decrease. In 1898 it reached the exceedingly small percentage of 0.29 per cent of the total mortality for the year. In 1899 a new epidemic appeared, with a mortality up to March 1st of 1.9 per cent. For the next six months we had the following condition of affairs:

Cases reported in	March...	522	Deaths...	68
"	"	April ...	"	... 71
"	"	May	"	... 68
"	"	June	"	... 43
"	"	July	"	... 20
"	"	August ..	"	... 28

Total cases 2,436 Total deaths 298
a mortality of the reported cases (12.23 per cent)
curiously enough almost exactly the same percent-
age as the mortality in the epidemic of 1859
(12.6 per cent).

HISTORY.

The epidemics in Spain and Italy (1610-18),

described by Mercatus and Syambatus, were probably those of scarlet fever (Bohn), but the first accurate account of the disease is that given by a Dr. Doring of Breslau about 1625. Sennert soon after described outbreaks of the disease at Wittenberg, Brieg and Schweinfurt (1652). In 1670 to 1675 an epidemic raged in London and gave Sydenham the opportunity for his classical description of the disease, which, previous to that time, was supposed to be a malignant form of measles and was known by such fanciful names as morbilli ignei, rosalia, rubeolas, etc. Scarlet fever is supposed to have first made its appearance in the United States about 1735 and spread so slowly through the then sparsely settled country that Dr. Rush, less than a hundred years ago, wrote: "No physician would be likely to see it more than once in his lifetime."

Little or nothing was then known in this country of its contagiousness, although the senior Fothergill had, as early as 1750, conclusively proven the fact. Underwood, 1784, was the first, I believe, to note "that in some foreign parts, particularly Sweden, convalescence (in febris scarlatina) is often followed by anasarca." A conscientious editor later adds "these consequences of scarlet fever are not confined to Sweden. Anasarcous swellings are by no means uncommon in this country, particularly among the poorer classes of

society, whose accommodations and diet are not favorable to good recovery." (Merriman.)

CLINICAL DIVISIONS.

McCullum thinks the disease ought to be clinically divided into five types, viz.:

(1) The malignant, where death occurs in 24 to 48 hours, preceded by high temperature and unconsciousness.

(2) Temperature 102 to 105, marked throat and nasal complications, eruption brilliant and patient delirious.

(3) High temperature, brilliant rash, but no nasal discharge and throat symptoms not prominent.

(4) Eruptions not brilliant except in axilla and groin; temperature, 99 to 101 deg.

(5) No eruption on body, temperature only slightly elevated, typical papillæ on tip and edges of the tongue.

Holt's division—and a most convenient one—is into three forms, (a) the mild, (b) the severe, and (c) the malignant.

(a) The mild cases have slight disturbance at onset, with a temperature of 100 to 103 F. Eruption within twenty-four hours, preceded by punctate redness of pharynx and palate. Rash begins to fade on third or fourth day and has practically disappeared two days later. In very mild cases the temperature may not rise

above 101 deg.; the rash persists but one day and shows over only the chest or hips. So slight is the constitutional disturbance that the child is with difficulty kept in bed and diagnosis is only established by desquamation later found on the hands and feet. It should be remembered that there is great danger of subsequent nephritis in these mild cases and that they are from failure to quarantine the most frequent source of contagion.

(b) The more severe cases begin with sudden and repeated vomiting, and if the initial temperature is high one or more convulsions may occur. The temperature in these cases ranges from 102 to 105 deg. F. and the rash appears in twenty-four hours. Nasal complications are not infrequent and there is more or less pultaceous deposit on the tonsils.

(c) Malignant cases are characterized by a relative short stage of incubation, an initial high temperature (105 deg.) and the appearance of the rash, or serious cerebral symptoms within a very few hours after the first symptoms. The eruption in malignant cases is prone to show variations and have an irregular distribution, e. g., over one-half of the body, or to take on a pemphigoid or petechial form (black scarlet fever). The mucous membrane of the mouth is seriously implicated, being congested and often bleeding from points of ulceration. The teeth are covered with sordes and

membranous patches can be found on the tonsils, uvula or soft palate. Often there is an irritating discharge from the nose, the breath is fetid and there is great prostration. Such children rapidly succumb to a general septicemia, or, after surviving a week of continuous high temperature, slowly progress to more or less complete recovery.

The urine in all serious cases shows traces of albumin early in the disease. Later this may be greatly increased and hyaline and epithelial casts and blood corpuscles found.

"Foudroyant scarlatine," as it is expressively named by the French, is that form of malignant scarlet fever in which the cerebral symptoms predominate and death occurs within the first forty-eight hours from overwhelming toxemia. In these cases the onset is frightfully sudden and totally unexpected. The child falls without warning into a deep stupor, or after one or more convulsions passes into somnolence whose only recognizable cause is hyperpyrexia (105 to 107 deg.). Death often comes before the appearance of the rash or complaint of sore throat. If the eruption appears it is delayed, irregular in appearance, or petechial in character, and cyanosis is a frequent complication of these cases. The general resemblance to the congestive chill of tropical malaria is striking and death is even more certain in the case of foudroyant scarlatina. The autopsy gives no suf-

ficient reason for death which in these cases undoubtedly occurs from toxemia.

A typhoid form, described by Jaccoud, is found in those cases where convalescence is slow and autointoxication has taken place. In these cases the tongue is dry and brown, the lips fissured, the abdomen tympanitic and not infrequently there is diarrhea, as in typhoid. In a majority of these cases the origin of the sepsis may be found in the throat, which is covered with pultaceous debris or grayish membrane—in some cases true diphtheria—with septic discharge from the nose and frequent epistaxis. The temperature is high and fluctuates as in septic cases, the pulse small and frequent and the child dies either from exhaustion subsequent to hemorrhage, or from general inanition, often in a state of coma.

INCUBATION.

The period of incubation varies from two to six days, so that a child that shows none of the symptoms of invasion for eight days after a single exposure to scarlet fever may be considered to have escaped infection. The incubation stage in the so-called surgical scarlatina is much shorter, often but a few hours (Holt), and as a general rule it is true that the more severe the case, the shorter its stage of incubation. Holt gives from

personal observation the period of incubation in 113 cases, viz.:

Less than 24	Five days..... 6 cases
hours 6 cases	Six days15 "
Two days.....15 "	Seven days 8 "
Three days28 "	Eight days and
Four days25 "	longer.....10 "

or, 66 per cent of these cases occurred between the second and fourth days and 87 per cent before the seventh day.

INVASION.

The onset of scarlet fever is usually sudden, frightfully so in the malignant cases, where death may come before diagnosis is established. Generally vomiting without previous nausea is what first attracts the attention of the parents. Inquiry proves the existence of a sore throat and examination shows swelling of the tonsils and minute red points on the hard palate. Temperature 101 to 105 deg., although there is frequently complaint of chilliness and general malaise. With a temperature over 104 deg. convulsions are not infrequent with young children and diarrhea is not uncommon in the summer time.

ERUPTION.

The typical scarlatinal eruption may be expected to appear twelve to thirty-six hours after the initial symptoms, though cold or improper treatment or intercurrent diarrhea may delay the

rash for another day or two. It should be remembered that the eruption of scarlet fever never begins on the face, but may be looked for earliest on the chest, thighs, or small of the back, if the child has been kept warm in bed.

On close inspection, the scarlatinal rash, or blush, as it appears at a distance, will be found to be made up of a vast number of tiny papules of an intense scarlet tint, due to localized points of infiltration surrounded by a zone of intense congestion. These zones of arterial congestion produce the scarlet points so closely resembling the bright red stippling of the shell of a boiled lobster to which the scarlatinal eruption has been aptly compared.

As there may be variations in the number, tint and pathology of these points of cutaneous infiltration, we may have great variation in the appearance of the scarlatinal eruption. The eruption may be so discrete, pale in color and cause so little annoyance that it may escape the attention of the mother, or be considered a transient trouble due to indigestion, especially if preceded by vomiting.

On the other hand the eruption may be so general and so intense in color that the child looks as if it had had boiling water poured over its body and the face and hands will be swollen, hot and burning. Or the eruption may take on a patchy character, the rest of the skin remaining normal

in color; rosy patches being found by preference on the neck, abdomen or buttocks. The pressure of a fingernail, or pencil, drawn across these patches leaves a somewhat persistent white line, thought to be diagnostic of scarlatina.

In other cases the papules may be so enlarged as to give a distinctly papular appearance to the rash (*S. papulosa*), or they may be topped with a minute vesicle, when the disease is called *Scarlatina miliaris*. In those cases in which this miliary eruption is nearly confluent, desquamation takes place in flakes instead of scales; a cast of the fingers, toes or back of the hand coming away in a single piece.

Purpuric scarlatina is that form of the disease in which the cutaneous congestion is so intense that some of the capillaries rupture and form petechial spots (*S. petechialis*).

Pemphigoid scarlet fever is that form in which the eruption terminates in blebs or blisters, which fill with a sero-purulent fluid and break, leaving a purplish mark behind.

Scarlatine fruste is the name given by Trousseau to that form of scarlet fever in which the eruption, instead of persisting four to eight days, lasts only as many hours. Nash, in a recent number of the British Medical Journal, reports "nine cases of scarlet fever in which there was no sign of a rash" (*Scarlatina sine erythema*), the diag-

nosis being established by fever, angina and subsequent desquamation. Scarlatinal nephritis is exceedingly prone to follow these cases of abortive scarlatina.

Itching as a rule is not present with the scarlet fever eruption. There is a sensation of heat and general discomfort, but children rarely scratch themselves while broken out, however hot the skin may feel to the hand (Moizard).

The time of the appearance of the scarlatinal eruption is not uniform. It ought to appear in forty-eight hours after the initial sore throat, but does not without exception, nor does it always begin to fade in the same order that it appears. The rash may not make its appearance until the third day, or even as late as the fifth, and may recede and reappear in a way very unlike a case of typical scarlatina. Holt's tables drawn from his large hospital experience gives the following duration in 108 cases:

DURATION OF RASH.

	Cases.		Cases.
Persisting two days		Eight to eleven days.	16
or less.....	5	Over eleven days...	4
Two to seven days	81	Recurrent rash	2

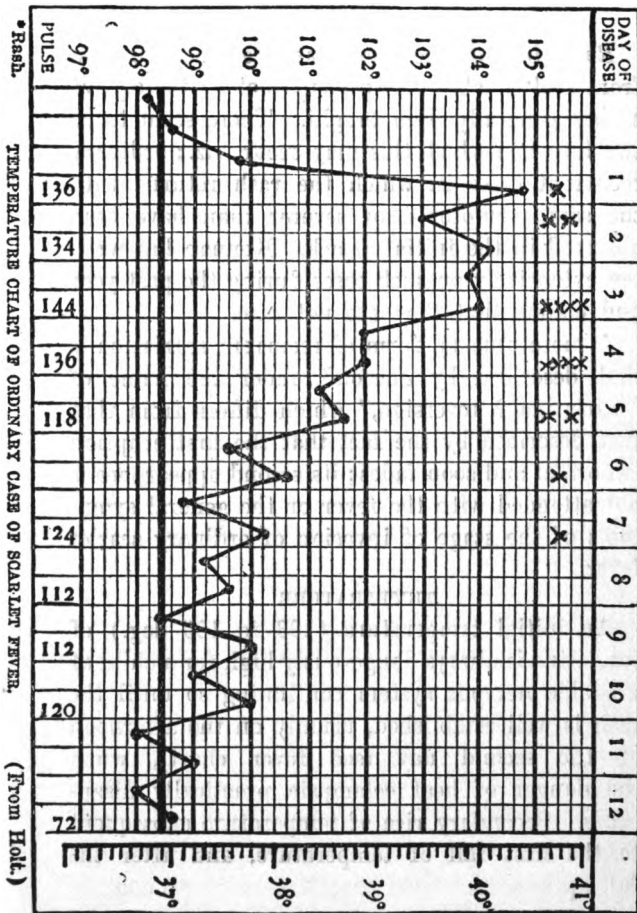
As a general rule it may be laid down that where the rash has not markedly paled within four days from its initial appearance, a case of uncomfortable duration and generally unpleasant complications may be looked for.

Relapsing, or recurrent cases, as may be seen from Holt's table, are perhaps not as infrequent as has generally been taught. There seem to be two forms in which this may occur, viz.: ordinary recurrent cases in which the rash returns with the same symptoms, or severer than have been observed in the initial attack. Kennan has written extensively on such cases during the past year and claims that they are not rare.

A more unusual form of recurrent scarlatina is that described by Jaccoud under the name of "scarlatina à reversion," which differs from that just described by the fact that the first eruption is normal and soon fades; its second appearance is not attended with the fever or the general symptoms of the stage of invasion of ordinary scarlet fever.

TEMPERATURE.

An initial temperature (103 to 105 deg.) of scarlatina is always dangerously high for a child of unstable nervous system continuing so until the rash is well established, usually on the afternoon of the second day (see fever chart), when the danger of heat eclampsia practically disappears. Secondary rise of temperature subsequent to the first fall of temperature, and after the full appearance of the eruption, indicates complications of some kind, hence the absolute necessity of a careful fever chart, even after convalescence is



apparently established. So long as the temperature remains high we must expect thirst, restlessness and probably delirium in the average American child. These should not persist for more than four or five days in an ordinary case. A rise of temperature after the fifth day is not necessarily serious even if it continue for ten days with diurnal fluctuations, but a continuous high temperature after that time is a serious matter.

Feverless scarlet fever sounds like a misnomer, but nevertheless in cases of doubtful diagnosis it should be remembered that such a possibility exists. These cases are fully discussed in Grandin's recent "*Maladies de l'Enfance*," by Moizard, who claims that "it is impossible to deny the existence of apyretic scarlatina."

Desquamation.—This begins shortly after the disappearance of the rash and may persist for several weeks, the last of the exfoliation usually being found between the fingers and toes. As desquamation is dependent upon the extent of death to the epidermis, exfoliation is in direct relation to the extent of the initial eruption. Hence in cases attended with a vivid and dense rash, the dead cuticle may come away in coherent strips and patches, but these are exceptional cases, as usually exfoliation occurs in fine, brawny scales, first found on the neck and chest, or on trunk and hips

and most persistent on the hands and feet, where its traces may be found often for six or eight weeks. Holt calls attention to the characteristic appearance of the fingers in these cases, viz.—their pink tips of fresh epidermis surrounded by dull gray and desquamating skin.

The tongue is at first red at the tip and lightly coated with white, through which in a day or two the enlarged and reddened papillæ project, giving the appearance known as the strawberry tongue, to which more diagnostic significance is usually attached than the writer thinks is deserved. Later desquamation of the furred tongue and swelling of the papillæ produce the so-called raspberry tongue.

Nervous Symptoms.—All who have had to do at all extensively with scarlet fever cannot have failed to note that in certain cases nervous symptoms are often the most prominent. These are great frequency of the pulse without corresponding elevation of temperature, great restlessness or anxiety, a sense of choking without serious angina, or dyspnea without pulmonary complications. The lips are dry, the tongue reddened, the throat livid and the tonsils covered with a pul-taceous deposit. The child is delirious or chatters incessantly. The eruption is apt to take on a petechial character and the extremities grow cyanotic. The urine is scant or entirely suppressed

and the child dies in a day or two in a state of algid collapse, or from heart failure (syncope).

DIFFERENTIAL DIAGNOSIS.

If we accept Holt's dictum that desquamation occurring upon both hands and feet after a doubtful case is conclusive evidence of scarlet fever, no matter what the other history may have been, we have in this the only infallible diagnostic sign with which the writer is acquainted. Possibly Dr. Class' bacterial investigations may result in microscopic proof as satisfactory as that which we now have in the case of diphtheria, but as yet scarlatina is a disease of protean and misleading manifestations especially in its abortive forms.

An ordinary, typical case of scarlet fever offers no difficulties in diagnosis, but unfortunately many cases are not typical and frequently the physician is not called until differentiation becomes a matter of great difficulty. On the other hand there are cases of acute indigestion in children accompanied with high temperature (105 to 107 deg.), vomiting and reddened throat, which at the onset are puzzling enough to deceive the most expert physician.

Some of these cases show a scarlet erythema as well, but if time can be obtained to reserve your diagnosis, a brisk dose of calomel followed by citrate of magnesia will clear up the diagnosis and rash at the same time.

As a general rule it is safe to treat every case of sudden illness with inexplicable rise of temperature (102 to 105 deg.) and sore throat as if it might be a case of scarlet fever. Isolation of these cases for twenty-four hours from the rest of the family can do no harm, nor inflict any serious injury upon anyone, even if your diagnosis proves a mistake, while a neglected case of scarlet fever may spread contagion far and wide. The most puzzling cases to the writer are not those of acute indigestion erythema, but the rashes which accompany other infective diseases, as diphtheria where there is sore throat, or rashes produced by apyretic drugs, as quinine or antipyrine given in febrile attacks.

McCullum (Phil. Med. Journal) claims that "the appearance of a punctate eruption in the arm-pits and groins with congestion of the tonsils and a punctate eruption in the roof of the mouth, no matter whether there is any eruption elsewhere, are positive proofs of scarlet fever." It should be remembered that it is entirely possible for scarlatina to be complicated with other of the exanthemata, especially with varicella. Vogel notes coincident cases of scarlatina and variola and also its association with measles.

COMPLICATIONS.

Since the treatment of scarlatina simplex concerns itself largely with the prevention of com-

plications, it is very necessary to bear in mind those that are most frequent and those to be most dreaded. Sufficient space has already been given to the significance of temperature and abnormal forms of eruption. Next in importance are the throat complications.

Throat Complications.—Angina is always to be expected in scarlet fever, although it may be of so mild a degree as to escape the attention of those in charge of the child (*Scarlatina sine angina*). Usually there is complaint of sore throat and sufficient swelling of the tonsils to produce a change in the voice and difficulty in swallowing.

Later, in almost all cases of moderate severity, there may be found by the second or third day yellowish patches which, unlike true diphtheritic membrane, are easily removed by swabbing.

In severer cases these patches spread to the soft palate, uvula and pharynx, and may invade the Eustachian tube and nasal cavities, producing a seropurulent excoriating discharge from the nose. Death may occur in such cases from absorption of septic material and general sepsis, or the end may come from hemorrhage following extensive gangrenous sloughing in the throat, nares or the tissues of the neck. This local necrosis is often spoken of as diphtheritic, but such it is not in the modern sense of the word, for the sloughing is due, not to the diphtheritic bacillus, but to streptococcus in-

fection. Hence the process is one of indefinite duration, not with a limited life history, as is true of true diphtheritic membrane.

Unless efficient local antisepsis is attained, the tonsils are covered again and again with a soft, putrid, whitish smear, which can be removed by a brush or swab, but returns again and again to the great danger of the child. This foul-smelling matter contaminates the breath, sickens the stomach and poisons the child. A similar infection takes place in the nose, which discharges a fetid, excoriating mucus, and by extension enters the middle ear. Next in frequency and as an inevitable result of the sloughing in the throat we find sub-maxillary adenitis, and often later adeno-phlegmon.

Adenitis.—Since the cervical lymphatic glands are the drainage canals for the refuse of the tonsils and pharynx, we find them as a rule moderately enlarged in all cases of scarlatinal angina. In severer cases they become swollen and tender. When there is a neglected membranous deposit on the tonsils and palate the lymphatic glands become greatly swollen and very tender. The whole neck may become involved from interference with circulation until the head must be kept held backwards to relieve the pressing dyspnea. Such glands frequently proceed to suppuration and extensive sloughing. A case of J. Lewis Smith's was

attended with so great destruction of the tissues of the neck, that finally the great blood vessels lay exposed to sight and death resulted from perforation of the carotid by ulceration.

It should be remembered that while sub-maxillary adenitis, to a greater or less degree, is never absent in scarlet fever, involvement of the lymphatics is not confined to those of the neck. Inguinal adenitis is by no means infrequent, and multiple abscess is a frequent tedious complication in recovery. About the end of the first week we frequently find otitis.

Otitis Media.—This, for the same reasons as those just given, is an alarmingly frequent complication in those cases where the care of the throat has been imperfect or the disease malignant from the start. A good proportion of these children remain permanently deaf, or death may result from extension to the meninges of the brain via the middle ear and the production of septic meningitis.

Pulmonary complications are among the more infrequent ones of scarlet fever, and the same is true of laryngitis, as compared with measles.

Broncho-pneumonia is infrequent except in the case of very young children. It rarely makes its appearance before the first week and runs the usual course of a septic pneumonia.

Arthritis ("Scarlatinal rheumatism") is a pain-

ful complication which in some children makes its appearance about the time of the disappearance of the eruption. It attacks by preference the knees and elbows and cannot be distinguished by any outward appearance from articular rheumatism. It has, however, a proneness to result in suppuration such as is not observed in ordinary rheumatism, though curiously enough the pain in either can be relieved by the same line of medication.

Diarrhea or even dysenteric attacks may mark the crisis of the disease. Unless excessive, they should not be too hastily checked, as they are usually prognostic of a comfortable convalescence.

Scarlatinal nephritis is justly the most dreaded of the complications of scarlatina. A mild grade of renal catarrh is in all probability present in all cases of scarlet fever, no matter how mild. In fact, the milder the case the greater necessity for watching the action of the kidneys, which in these mild cases do relatively an excess of work in carrying off the specific toxins which usually irritate the skin by their excretions through its pores. Hence, from the very beginning, we can find in the urine of scarlatinal patients epithelial debris and generally traces of albumin.

If the child is kept warm in bed and on a carefully-selected diet this form of renal catarrh usually disappears with the cessation of its cause.

about the end of the second week, but cold, errors in diet, or the persistence of complications, may suddenly produce dropsy and death.

TREATMENT.

The treatment of scarlet fever, like that of all other self-limited diseases, should be largely expectant, but not neglectful of possible complications. In the foudroyant cases treatment is useless, for the child is dead before a diagnosis is made or assistance possible. Fortunately these cases are rare, but other varieties are among the most frequent ills that come to the city practitioner's hands. In their treatment it is always well to remember the Galenic advice: "*Primum est non nocere.*" This would exclude all methods yet devised to kill the peccant microbe without injury to the patient. No specific, safe or otherwise, has yet been discovered, and the most efficient treatment is that which best adds to the comfort of the child and anticipates possible complications. The mild attacks require no treatment at all except rest in bed for a week and some antiseptic gargle, such as diluted listerine or equal parts of peroxide of hydrogen and cinnamon water, used often enough to keep the throat clean and comfortable.

But these mild cases are those in which the kidneys need the closest watching, since the largest toxin elimination takes place through them when

the eruption is light. The mildest cases should be most carefully watched, confined to the house for four weeks, and an examination of the urine made at least once a week or as much oftener as the case demands. It should be remembered that a single negative examination does not exclude the possibility of limited nephritis, which may give evidence of its existence a few hours later, especially after errors in diet or exposure to cold.

Jaccoud claims that an exclusive milk diet for four weeks is an absolute safeguard against post-scarlatinal nephritis, but such regimen, especially in mild cases where it is most needed, is very difficult with the average American child.

In the writer's experience koumyss, custards, broths, blanc mange, jellies, baked apples and fresh fruits may be safely added to a milk diet, but meat should be absolutely tabooed so long as there is any evidence of renal irritation. Roberts rightly names spring water the best of the diuretics, and whatever diet may be chosen by the attending physician, he should not forget to insist upon the copious drinking of lithia, Bethesda or Poland water during convalescence.

Inunction adds so much to the comfort of the child that it ought to be practiced from the first appearance of the eruption and persisted in until the conclusion of desquamation. The old fashioned use of unsalted lard or ham-rind, undoubt-

edly did much to prevent the spread of the disease. J. Lewis Smith speaks very highly of the use of the following:

R.—Acid carbolici.

Olei eucalypt., aa.....dr. 1

Olei olivæoz. 6

M. Sig.: Apply every 3 hours.

Inunctions with cacao butter after bathing the skin with hot soda water (one dram to the pint) is very grateful to the patient, or if more efficient antiseptis is desired at the same time it may be obtained by the use of this ointment:

R.—Thymolgr. 10

Alcohol, q. s., ad. sol.

Olei theobromæoz. 1

Mix to make an ointment, which should be applied at least thrice a day.

As there is no specific for scarlet fever, treatment must be symptomatic and prophylactic. For the initial nausea and vomiting the following has been found efficient:

R.—Aquæ cinnamoni.

Aquæ calcis, aafl.oz. 1

Tinct. gelsem.fl.dr. $\frac{1}{2}$

M. Sig.—Teaspoonful every hour for nausea.

Ringer highly commends tincture of aconite, given in drop doses every quarter of an hour until arterial tension is relieved. Antipyretics, except perhaps lactophenin when the temperature reaches 104 deg., are to be discouraged,

and sponging or cool packs are to be substituted as required instead.

Chloral hydrate has proved in the hands of the writer an exceedingly valuable remedy. More than anything else it promptly relieves the nervous tension and restlessness of the stage of eruption, insures sleep and acts favorably as a renal anti-septic. The dose must of course be regulated in accordance with the age of the child. A convenient method of administration is the following:

R.—Chloral hydratedr. 1—2
 Infusion digitalisoz. 1
 Syr. raspberryoz. 3

M. Sig.—Teaspoonful every 2 or 3 hours with increased dose for sleep at night.

A tardy eruption should be hastened with hot teas, warm water and a mustard pack if the case seems threatening, and where there is associated collapse, iron and alcoholic stimulants may be freely used. Dr. Chapman's rule for the administration of iron and whisky, viz., a drop of tincture of iron for each year of the child's age in a tablespoonful of stimulant every hour, is excellent, and the tolerance of children for alcohol in these septic conditions is amazing.

The local treatment of the throat is too often neglected to the subsequent detriment of the child. As Underwood wrote long ago concerning syringing the child's throat, "the quality of the remedy is

perhaps of far less importance than its being frequently made use of, which is absolutely necessary," a fact that must still be kept in mind in the treatment of scarlatinal angina. Hence gargling, when the child is old enough, or spraying and swabbing when gargling is inefficient, must be insisted upon and looked after by the physician if necessary. The choice of the local antiseptic is less important than its frequent use, hot water often being as grateful and useful as anything else in my experience. Peroxide of hydrogen, diluted with twice its bulk of lime water just before using, is exceedingly efficient and can be highly recommended as a gargle, especially where there is suspicion of the formation of diphtheritic membrane. The same may be used for syringing the nares, after first cleansing the parts with warm boric acid solution.

Cerebral symptoms may be expected whenever there are serious nasal or aural complications. Their appearance calls for better local antiseptics or the aid of the consulting aurist. In the interval the comfort of the child may be obtained by the use of chloral and bromide, or phenacetin in safe doses.

Adenitis is generally overtreated rather than neglected. Its significance points to blocking of the lymphatic glands with septic debris usually from the pharynx. Hence it calls for better disinfection

rather than the painting of the inflamed glands with iodine or covering them with poultices. The application of camphorated oil and covering with cotton wool is usually all that is necessary.

Nephritis is the most frequent complication of scarlatina, and the one most carefully to be watched for. Confinement in bed and to a liquid diet are the best methods yet known for minimizing the occurrence of this danger, but too frequently these safeguards are disregarded until scanty urine and puffy eyelids announce the existence of scarlatinal nephritis. This calls for the use of some prompt and efficient diuretic mixture, such as:

R.—Potass. acetatis.

Potass. bicarbonatis.

Potass. citratis, aadr. 2

Infus. tritici repent.....oz. 8 •

M. Sig.—Teaspoonful in water every 2 or 3 hours for 5 years' old child.

A more palatable and fairly efficient mixture is:

R.—Liq. ammonii acetatis.

Syrupi acidi citrici, aaoz. 4

M. Sig.—Teaspoonful in lemonade every hour.

If in spite of these remedies the dropsy increases, diuretin (gr. 2 to 5) should be alternated with the above, and purging—if the strength of the child permits it—and diaphoresis resorted to. A cream of tartar ($\frac{1}{2}$ oz. to the pint) lemonade is

a pleasant method of accomplishing the first and pilocarpine or the hot air bath may be used to produce profuse sweating. If pilocarpine is employed it is well to use an alcoholic stimulant at the same time and to alternate the use of the diuretic with a brisk laxative on alternate days.

Ascites can often be removed more promptly by the use of an elaterin triturate than by any other remedy known to the writer, looking well after the heart's action with strophanthus or spartein sulphate if, as is frequently the case, it is found that infusion of digitalis is poorly tolerated by the sensitive stomach. Reserve nitroglycerine (1-100 gr.) and amyl nitrite for emergencies.

Arthritis is surprisingly amenable to relief by salicin and codein, or salicylate of soda in some pleasant mixture.

The pain of otitis can be alleviated by the use of carbolized glycerin (1 per cent) and warm fomentations. A purulent discharge should never be neglected nor the child considered well until it has entirely ceased. Acetanilide is excellent for febrile otitis with great pain.

Diarrhea, when excessive, can ordinarily be checked by paregoric, but looseness of the bowels is rather a favorable sign than otherwise.

The use of camphor and musk, as advised by the German writers in cases of failing strength and septic intoxication, have never been of any avail

in the hands of the writer. Strong black coffee and quinin by rectum have tided over a few uncertain cases, and quinin inunctions are I am sure of real value.

PROGNOSIS.

Prognosis in scarlet fever must be largely influenced by the character of the prevailing epidemic and the previous condition of the child. The virulence of the scarlatinal poison and the susceptibility of the one attacked determine the degree of restlessness, jactitation and delirium observed. Initial eclamptic attacks rarely occur, except in unusually nervous, susceptible children, and hence their occurrence is of unfavorable portent.

As a rule an early and extensive implication of the cervical lymphatics is the forerunner of serious throat complications. Nasal diphtheria complicating scarlatina is of gravest import, and the gravity is proportionate to the early age of the child, children under four years giving as high a mortality as 28 per cent. The younger the child the more guarded should be the prognosis, especially when the temperature remains high (104 to 106) or there is much diarrhea or extreme restlessness, or the angina is malignant. Drowsiness is always an unfavorable symptom and a high temperature continued into the second week is sufficient ground for serious anxiety, but the prognosis

in uncomplicated cases is good. Death is rare in such except in young children. Moizard records several such cases when the infant suddenly expired, although it was not previously supposed to be seriously ill, death taking place without convulsions, disappearance of the rash or any unfavorable symptoms except thready pulse and loss of consciousness.

Persistence of vomiting is always an unfavorable symptom. Permanent cerebral lesions, such as paralysis, blindness, aphasia, loss of memory and hemiplegia, are not infrequent sequelæ, and a large proportion of cases of deafness in children are due to previous scarlatina.

Post-scarlatinal nephritis is the most favorable form of parenchymatous inflammation of the kidneys and usually ends in recovery within a few weeks by means of copious diuresis, but it is worth remembering that an excessive secretion of uric acid which often persists well into convalescence may form gravel or calculi. As a rule epithelial casts and debris persist after the disappearance of the albuminuria, sometimes for an exceedingly long time, especially in cachectic children.

Death rarely occurs before the fourth day and not usually later than the seventh day, except from post-scarlatinal nephritis or sepsis. Sudden death may occur from rapid increase of dropsy, either into the peritoneum, pleura, pericardium

or ventricles of the brain, or from edema of the lungs or glottis. Or death may come more slowly from inflammation of the lungs or the pericardium, or still more slowly from gangrene of the genitals or from bed sores; or it may occur at any later date from general exhaustion with toxic stupor or from any of the septic inflammations, such as septic pleurisy, pneumonitis, nephritis or heart complications. Broncho-pneumonia is one of the more infrequent complications, except in the case of very young children. It rarely makes its appearance before the first week and runs the usual fatal course of a septic pneumonitis.

PROPHYLAXIS AND SPREAD.

The physician who simply cares for his patient, without careful isolation or attempt to prevent further contagion, has been criminally negligent in his duty to the community. Scarletina is not one of the most contagious diseases of children, but it is one in which the poison retains its virulence for many months. Class's investigations seem to show that the microbe can be most easily cultivated from the secretions of the throat and the branny scales of desquamation. Hence the absolute need of quarantine from the initial sore throat to the disappearance of the last scales from between the fingers and toes.

Four weeks from the beginning of the disease is usually necessary for the completion of the

process, and another week should be allowed for outdoor exposure before returning to school. This is Dr. Lambert's rule, and I think an excellent one, although the quarantine is longer than that usually insisted upon by the attending physician. For at least one month should the patient be kept separate from those who have not been exposed to scarlet fever, and all of the articles handled or used by the child during that time should be either destroyed or scientifically disinfected before use elsewhere. Domestic animals, letters and toys are frequent conveyors of contagion in otherwise inexplicable cases.

Dr. Holland insists that clothing may retain the poison for years, and to the writer's knowledge a child's fur cloak which was kept packed for more than a year carried the disease to a logging camp which had been isolated from all outside communication for months previously.

Up to the present time all attempts to render children or animals immune to scarlet fever have failed, hence our efforts to prevent the spread of the disease must be confined to the individual patient. The brightest and best ventilated room in the house should be devoted to the sick child.

The presence of a grate in the room is an excellent aid to efficient ventilation, for all of the doors to the room, except one, should be closed and calked, and on the outer side of the remaining door

a large sheet should be hung and kept moistened with some reliable antiseptic. All bed clothing, night dressings, handkerchiefs and washable articles used by the child or nurse, should be dropped into a bichloride solution immediately after using. All other articles should be burned or disinfected with formalin vapor, which is easily obtained by the evaporation of a 40-per-cent aqueous solution over a suitable lamp, after the child is able to leave the room. Sulphur candles, burned over a tub of water, are also efficient, but they are much more inconvenient for use and more tedious in their operation, especially with poor people, where it is often almost impossible to give up the use of a room for an entire day. Furthermore, formalin does not black brass and other metals as does sulphur, and there is less danger of fire from its use.

PATHOLOGY AND BACTERIOLOGY.

The post-mortem findings of scarlatina are those of its complications, for, except in its malignant form, death rarely occurs save from some complication of scarlet fever. Hence an autopsy may show the lesions of pneumonia, nephritis, pleurisy, pericarditis, endocarditis, meningitis, empyema, or the bacterial evidences of general septicemia. Some pathologists have sought to prove the existence of a pathognomic scarlatinal nephritis, but its lesions are only those of an acute, exudative, glomerulo-nephritis (Welsh), such as may be pro-

duced by the passing of other toxic substances through the kidneys. Macroscopically the scarlet fever kidney is large, flabby, and its cortex is thick and pale with injected capillaries. Microscopically we find swelling of the epithelium; hyaline substance is found both in the convoluted and straight tubes, which may also contain red and white corpuscles. The glomeruli are larger and more opaque than normal; the individual capil-

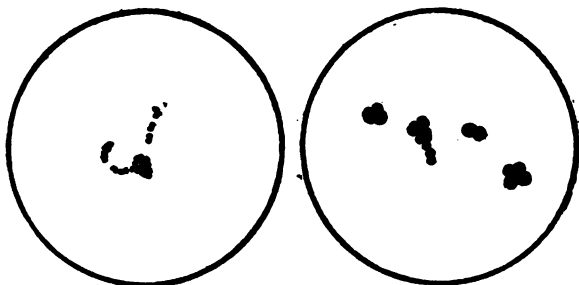


FIG. 1—STAPHYLOCOCCI AND STREPTOCOCCI. FIG. 2—DIPLOCOCCI FROM A CULTURE TWO WEEKS OLD, SHOWING TETRAD.

laries in the glomerulus are somewhat indistinct, and in severe cases there are masses of cells between the glomeruli and the capsule. Delafield finds in a scarlatinal kidney, wedges of connective tissue growth in the cortex, following the line at the artery. The more acute the disease and the longer its duration the denser the connective tissue.

The exudation from the renal vessels may be so considerable as to show red and white corpuscles, casts, and a large amount of albumin in the urine, which often shows inexplicable variations in the amount of these abnormal constituents from day to day. Bartel's explanation is that this variation in the urine arises from the irregular secretion by the sound and diseased parts of the kidney. Hence there may be at times a perfectly normal urine secreted, and a few hours later one that contains albumin, casts and blood corpuscles. Anasarca and serous effusions will be found in those dying of post-scarlatinal dropsy.

Dr. R. M. Pearce's post-mortems seem to prove that the only constant change found in the autopsies of scarlet fever patients is hyperplasia of the lymphoid tissue throughout the body. The lesions found in the skin are such as may be produced by the excretion of an irritant through the sweat glands, causing an acute dermatitis. Hence we find intense hyperemia with the dilatation of the small blood vessels in the skin, exudation of round cells into the rete, and thickening of the lining membrane of the sweat glands. Occasionally the sweat ducts are blocked with debris in which may be found blood corpuscles.

Throat lesions vary from a simple erythematous pharyngitis, with the usual appearance of a simple catarrhal inflammation, to a membranous angina,

in which may be found streptococci, staphylococci, or the Klebs-Löffler bacilli, the latter being relatively rare. The ordinary scarlatinal throat micro-organism is the streptococcus, whose life history is entirely different from that of the diphtheriae bacillus, but it should be remembered that true diphtheria may become engrafted upon a streptococcus slough and the disease rapidly run to a fatal termination. On the other hand it is true

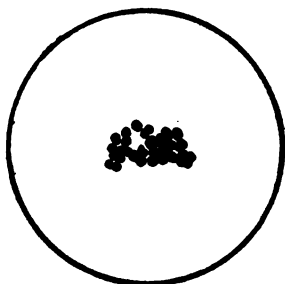


FIG. 3—DIPLOCOCCI FROM
A CULTURE ONE
WEEK OLD.

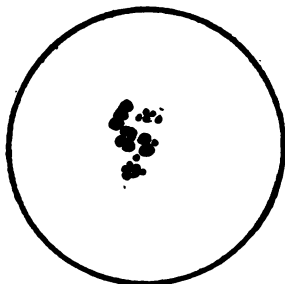


FIG. 4—DIPLOCOCCUS AND
STAPHYLOCOCCUS PYO-
GENUS AUREUS.

that most of the so-called post-scarlatinal diphtherias are not diphtheritic in the modern sense of the word, but simply the pultaceous sloughs of streptococcus angina. In all doubtful cases there ought to be a bacterial examination, such as is provided free of cost by the Board of Health of Chicago. Dr. Goodall recently ordered such bacterial examination of all the scarlet fever patients

(87) admitted into the Eastern Fever Asylum of London, with the following results: In six cases—all of which subsequently developed post-scarlatinal diphtheria—the Klebs-Löffler bacillus was found. In Copenhagen, 25 per cent showed diphtheritic bacilli. The present consensus of opinion is that post-scarlatinal diphtheria is due to exposure to unrecognized cases of diphtheria, which can largely be prevented by more careful bacteriological examinations and isolation.

Along this line of investigation should be noted the recent work of Dr. W. J. Class, undertaken under the direction of the Chicago Board of Health. Dr. Class reports the discovery of a specific organism—a diplococcus—in the scales and secretions of scarlet fever in the throat, previous failure, according to Class, being due to the use of faulty culture media. We quote as follows:

“After numerous failures, I succeeded in finding a culture medium (glycerine-agar, to which 5 per cent by weight of black sterile garden earth has been added) on which I have almost invariably been able to obtain, both from the scales and from the excretions of the throat, an organism which presents such characteristic features, both as to morphology as well as in its growth, that I have little hesitancy in stating that it is the specific germ of scarlet fever as proven in thirty cases.

“It is a diplococcus resembling a very large

gonococcus as ordinarily seen in slides made from fresh cultures. The two segments of which it is composed are very close together. This biscuit-shaped appearance is best shown in specimens that have but lightly been stained; in these there is also noted a transverse line running through each half of the organism, giving it the appearance of a tetrad. This appearance, however, is not constant, especially in older cultures in which the organism

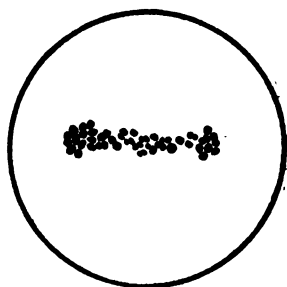


FIG. 5—DIPLOCOCCI FROM A CULTURE THREE DAYS' OLD (MOIST CULTURE MEDIUM).

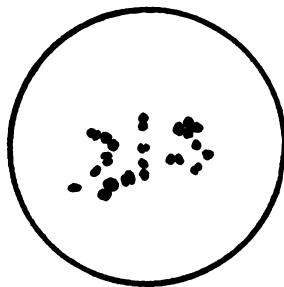


FIG. 6—DIPLOCOCCI—USUAL TYPE FOUND IN YOUNG CULTURE.

frequently presents itself as a diplococcus, both segments of which are perfectly globular. The lancet-shaped forms exemplified by the pneumococcus are, however, met with. Usually, unless in spreading the culture on the slide it is rubbed very hard, these cocci appear in bunches of from ten to fifty, which is due to the large amount of glutinous intercellular substance by which they

are united. Streptococcus forms are occasionally though rarely met with, as are also single cocci. The size of these germs varies considerably, but they are always larger than the ordinary pus cocci. They possess no capsule and have no independent movement."

CHAPTER II.

MEASLES.

SYNONYMS.—Morbilli, Masern, La rougeole, Rosolia, Morbilla.

DEFINITION.—A self-limited, infectious, exanthematous disease, characterized by rose-red maculae, accompanied with nasal catarrh, conjunctivitis and a specific bronchitis and laryngitis, due to the elimination of a microbic toxin through the pulmonary mucous membranes.

HISTORY.

For many years measles was the general name given to all eruptive diseases. It seems to have been brought into Europe by the Saracens, though at that time measles, scarlet fever and small-pox all received the same name. The honor of differentiation belongs largely to Sydenham, and the proof of its microbic origin to the French investigators since 1882. The literature of measles is very extensive, but, as Comby justly observes, the work of Cruze, Feltz, Canor, Peclicke, Cornil, and Babes, have not yet solved the problem nor triumphed over all the difficulties which oppose conclusive proof of a pathogenic germ by all suspected, but which no one as yet has been able to isolate.

Holt claims that measles is at present more widely prevalent than any other eruptive fever. Its microbe has not yet been satisfactorily isolated, although proof is claimed by many, but whatever its origin we know that the contagion of measles is air born and short lived, but possesses remarkable power of propagation during its life history.

MORTALITY.

In children below one year it is one of the most fatal of diseases. Between two and three years its mortality is about fifty per cent (Chicago Health Department), but after two years the mortality rapidly diminishes. Paris statistics of the epidemic of 1895 show that the disease reached its maximum in July and its minimum in January. Holt well says that no disease is more to be dreaded in young children than measles in a large institution, not only on account of its severity, but the frequency with which in such subjects it is complicated with broncho-pneumonia, ulcerative stomatitis, or followed by miliary tuberculosis.

OCCURRENCE.

Measles has followed the track of commerce since the days of the Saracens and is now one of the most common, and, next to small-pox, the most contagious of the eruptive diseases. It is epidemic in all of the larger cities from which it spreads at short intervals over the surrounding country as



often as an unprotected population accumulates. When it first attacks a community or nation its mortality is often frightful, as in the case of the Faroe Islands. A similar occurrence took place in the Friendly Islands where, on its first appearance, it was frightfully fatal.

All children except very young infants are very susceptible and adults scarcely less so if they have not previously been exposed. Comby gives a case where a new born child apparently contracted measles in utero, as the eruption appeared twelve hours after birth.

The immunity of infants seems to be well proven by Jurgunsen, who, in a recent series of 41 exposures to measles, found that all children over six months contracted the disease, while of the 25 under five months, similarly exposed, all escaped contagion. Almost identical results are reported by Holt, and it may be laid down as a general rule that all children over six months exposed to the measles will contract the disease until better methods of prophylaxis are known.

ETIOLOGY.

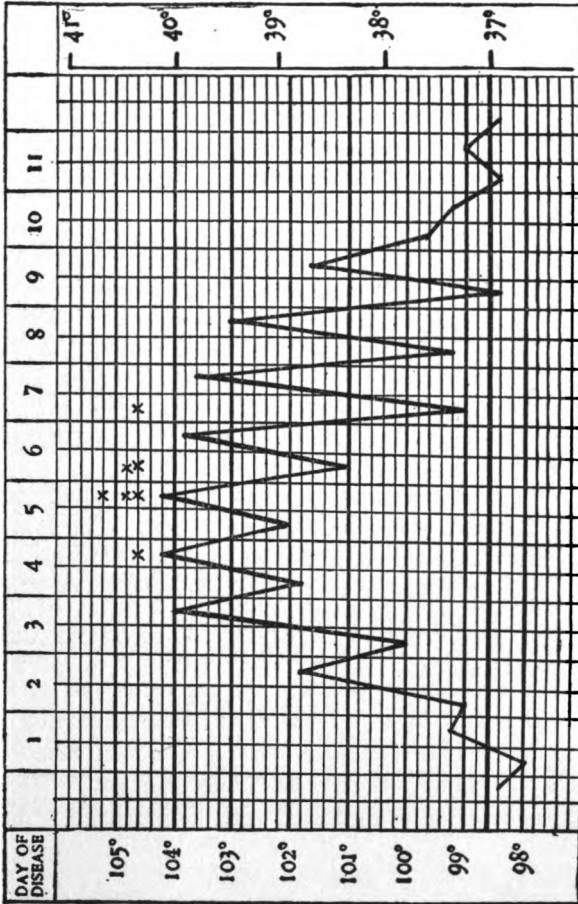
Owing to lack of efficient quarantine in the pre-eruptive stage of measles few children escape, as the disease is highly contagious from its very onset. The contagion does not appear to possess the vitality of scarlet fever for its potency is short lived and does not persist in infected clothing,

books and rooms, as do the germs of scarlet fever, but on the other hand fewer children escape than in the case of scarlet fever. Like scarlet fever, measles has a stage of incubation (9 to 14 days), one of invasion (3 to 4), one of eruption, and a subsequent stage of desquamation, though this is much less marked than it is in scarlatina.

The entire course of an uncomplicated case of measles from exposure to recovery ought not to exceed three weeks, though it is safe to consider it infective for another week. Four weeks' isolation in measles is the rule established by the Chicago Board of Health, except where there is persistent bronchitis, pharyngitis or discharge from the nose or ears, when quarantine is to be continued until the complication ceases. It should always be remembered that measles is highly contagious from the very beginning of its catarrhal symptoms and its contagiousness seems to be in direct proportion to the severity of the catarrh and its persistence. (Holt.)

SYMPTOMS AND COURSE.

The stage of incubation (9 to 14 days) is marked by no characteristic symptoms. The stage of invasion begins gradually and in young children is marked by heaviness and drowsiness, so much so that the old nurses used to say that a child was "sleeping for the measles." The first objective symptoms are those of nasal and



ocular catarrh, often accompanied with photophobia, coryza, hoarseness and a dry, hacking cough. Often there is a sharp initial rise of temperature, which may in half a day sink nearly to normal and then rise again to 103 to 104 deg., with morning remissions.

The eruption may be looked for on the fourth or fifth day, beginning usually on the face and neck, and thence spreading over the body. The eruption first appears in small, round spots, or irregular blotches, which usually have more of a bluish tint than scarlet fever, and which, unlike the erythema of scarlet fever, show always normal cuticle between the blotchy patches.

There is a curious "mouse-nest odor" usually to be detected when the eruption is out. The lymphatics are swollen, although slightly. The eruption of measles has very many variations. One of the more frequent is that known as *morbilla miliaria*, or that form in which each papule is topped with a yellowish vesicle. Or the cutaneous congestion may be so intense as to cause hemorrhage in the eruptive patches, causing *morbilla hemorrhagica*, known usually as "black measles." This form is often complicated with hemorrhage from the nose, vagina, conjunctiva or internal organs, and is always of grave prognosis.

With the completion of the eruption the previous temperature takes a sudden fall (crisis), follow-

ing which all symptoms may be expected to diminish in severity. About the third day the eruption begins to fade in about the same order as it appeared, the bloated appearance of the face disappearing slowly, but a brownish stain often persists for some time when the eruption has been well marked. Desquamation can be detected, but is usually so slight as to escape notice unless especially looked for.

Recovery is generally rapid in most cases, but should not be hastened, for as a rule the bronchial symptoms do not improve as rapidly as the others, and there is great danger of lighting up a capillary bronchitis even in cases supposed to be fairly convalescent.

COMPLICATIONS.

Perhaps more than any other of the exanthemata, measles is prone to show unexpected complications or sequelæ. Among these may be mentioned persistent conjunctivitis and blepharitis, especially in those children who are allowed to read while confined to bed. Persistent cough is often a very annoying symptom and is due to hyperemia of the glottis or at times to the formation of a fibrinous deposit upon the same.

The pulmonary complications are the ones most carefully to be watched for, since the brunt of the attack of the toxic elements seems to be directed to the mucous membrane of the lungs. Capillary

bronchitis is the most frequent and the complication most to be dreaded, especially in very young children.

Subacute bronchitis is a persistent sequela and when conjoined with bronchial adenitis, as is frequently the case, is attended with paroxysmal attacks of coughing very like those of pertussis. When the adenitis is persistent, it causes a wheezing respiration due to bronchiectasis,—what our Irish patients call an “impression on the lungs,”—with each return of fresh cold. These cases of chronic bronchitis with infiltrated bronchial glands are just those which are most prone to undergo caseous degeneration and rapid death from miliary tuberculosis.

On the other hand, measles in some cases effects an entire change of nutrition in the child, so that the one who has previously been frail, with poor appetite and deficient excretion, after a mild attack of measles becomes rosy, well nourished and blessed with an excellent appetite. Diarrhea is not an unusual complication at the time of cutaneous desquamation and may even assume a dysenteric character of a persistent type. Noma of the genitals is one of the rarer complications, with usually an unfavorable termination. Ulcerative stomatitis, especially in crowded wards, is tedious in recovery and may produce extensive sloughing of the gums. Chronic blepharitis and otitis are

found often in children neglected during the eruptive stage of measles.

PATHOLOGY.

The lesions of measles are those produced by the excretion of a toxin through the skin and mucous membranes, especially those of the respiratory tract. The earliest marks of this can be found in the mouth during the prodromal stage and are known as *Koplik's spots*, although earlier described in Gerhard's *Kinderkrankheiten*. These spots appear from 1 to 5 days before the cutaneous eruption and consist at first of illly defined small red dots with a bluish white center. Later these spots coalesce and are studded with little bluish white masses best seen under a strong light. Microscopically, these spots can be resolved into a mixture of diplococcus and epithelial cells, which disappear about the time the skin eruption is at its height.

Comby believes in the existence of a prodromal pultaceous stomatitis to be met with two or three days before the cutaneous eruption. The mucosa of the gums is unnaturally reddened and covered with a white pultaceous deposit. Sevestre describes an erythemia of the soft palate, which he considers prodromal and pathognomic.

TREATMENT.

As measles is a self limited disease our chief duty is to keep our patient warm in bed and

watch for threatening complications. There is a great dread of cool drinks during the feverish stage, so that the child is usually kept upon hot saffron tea or other teas, but personally I have never seen any ill effects from permission to drink freely of cool—not iced—lemonade or flax-seed tea with lemon ad lib. A temperature of 103 to 104 deg., with accompanying headache, can be greatly alleviated by two to three grain doses of phenacetin or lactophenin. For the annoying cough, I prefer a modified Wood's cough mixture:

R.—Liq. pot. citratis.....Cc 30
 Syrupi ipecacCc 5
 Tinct. opii camph.Cc 10
 Succ. limonCc 15
 Syr. toltanCc 60

M. Sig: Teaspoonful every 2 hours.—H.

If the bowels are constipated, or there is much headache, dilute hydrobromic acid may be substituted for the paregoric in the above mixture and if necessary minute doses of codeine may be alternated with the cough mixture to relieve the harassing cough. Cod liver oil with syrup of iodide of iron should be used wherever enlarged bronchial glands are suspected, and persistently until the tendency to recurrent colds is overcome.

Prophylaxis is usually inefficient, since probably the prodromal stage of measles is the most contagious. Some think the urine is the usual carrier

of contagion. Quarantine usually does not begin early enough and is not long enough continued to properly protect the community.

CHAPTER III.

ROTHELN, OR GERMAN MEASLES.

SYNONYMS.—German Measles, Bastard Measles, Rubella, Rubéole, Rubeola sine catarrho, Rubeola nota, Roséole febrile ou épidémique of Trousseau.

DEFINITION.—A contagious, self-limited, eruptive disease, characterized by rose red spots, induration of the cervical glands, transient fever, and usually mild angina. The term röteln was originally applied to an attack of measles complicating or following scarlet fever (Bagen).

HISTORY.

Perhaps none of the minor ailments of childhood has given rise to sharper discussions or a wider difference of opinion than has arisen over the existence of röteln as a disease sui-generis. Much of this discussion has arisen from looseness of differentiation between the various eruptive diseases and a consequent confusion of nomenclature. Thus the earliest use of the term rubeola seems to have been as a synonym of scarlatina. Later Hildebrand applied the same name to a disease which he considered a hybrid of scarlet fever and measles.

According to Boullöche, Willan was the first to accurately describe this disease, which he named

rubeola sine catarrho, and differentiated chiefly from measles by the fact that an attack of rubeola did not carry with it subsequent immunity from measles. Bademan, Maton (1819), Paterson, W. Tripe (1852), Balfour (1857), and Engleman, were all acquainted with the disease and described it with more or less accuracy. Paterson is deserving of remembrance from the fact that he was the first to note that while the disease in a vast majority of cases is benign, yet it is possible that it may become grave, even fatal, from its unusual complications.

The name rötheln seems to have been first used by Bagen (1752), and was used by him and many since to describe alternating attacks of measles and scarlet fever, or modified measles, or abortive scarlatina. Since the International Congress of 1881 it has been generally conceded that rötheln is a distinct disease and deserves differentiation from measles as much and for the same reasons as varicella from variola.

OCCURRENCE.

Those who have had most to do with German measles are those who have least doubts as to its contagiousness. It is at least as contagious, if not more so, than ordinary measles, and its period of incubation, as established during the epidemic in Chicago some years ago since, is 10 to 13 days.

Contagion is usually taken directly from those

suffering from the disease, though there seems to be good evidence to show that it may be carried by a third party. Like measles, it is contagious from the beginning of incubation, and a previous attack of measles does not protect from r  theln. It occurs, preferably in the winter or spring, as a well marked epidemic, but it may come coincidentally with scarlet fever or measles (Boulloche). It is largely an affection of young children, but adults are not immune, as recently seen in an Orphan Asylum epidemic, where the attendants as well as the children were in turn attacked. One attack protects from a second, but does not protect from either scarlet fever or measles, the converse of this also being true.

With a knowledge of these facts we cannot admit that r  theln is a modified measles, although this opinion has been held by Hebra, Kaposi and Townsend. Schonlein and Gintrac thought that r  theln was a hybrid of scarlet fever and measles, but there is no evidence proving the existence of any such hybrids of the zymotic diseases. That measles and scarlet fever may be associated, or closely follow one another, must be granted, and it is more than probable that the name r  theln was first applied to such association, but more careful study by competent observers of such anomalous cases prove them not to be r  theln. Nor are roseola and r  theln the same disease, for ordinary

roseola is not contagious and one attack does confer immunity from subsequent ones. Furthermore, the eruption is not as persistent as that of rötheln, is apt to return subsequently and is not attended with fever. The papules of variola ought not to be mistaken for rötheln, but such mistakes have been made.

SYMPTOMS.

The stage of incubation is without symptoms. The writer believes this period to be ordinarily 10 to 13 days, which coincides with observations of Gaucher and Bondet. On the other hand, Griffith thinks this may not last longer than five days.

Rötheln also differs from measles in that its stage of invasion is very short. This lasts only a few hours, instead of the two or three days of drowsiness and malaise which precede the eruption in ordinary measles. There may, however, be, in rötheln, brief headache, lassitude and slight fever previous to the eruption, which, as a rule, appears without warning in the midst of perfect health, with little or no discomfort to the patient.

ERUPTION.

The eruption may be first found on the face, on the cheeks and about the nose, and closely resembling that of measles, except that it is usually of a redder tint. Dupie states that it is possible for the macules of rötheln to be replaced by papules, analogous to those of smallpox, except

that their color disappears under pressure with a finger. It takes ordinarily only half a day for the eruption to spread over the body, often assuming, about the inside of the elbows and knees, an erythematous blush much like that of scarlet fever and attended with itching and smarting. Some authors attempt to differentiate a scarlatinal and measly form of r  theln, but as stated above the r  theln eruption is as apt to be of a mixed form—polymorphism being a characteristic of r  theln.

CATARRHAL SYMPTOMS.

Catarrhal symptoms when present follow, never precede, the r  theln eruption, and are light and transient as compared to those of true measles. Mild lacrymation, conjunctivitis and painless angina are noted in some cases, but there is no croupy cough nor the marked coryza of ordinary measles, though there may be a teasing cough for a couple of days. It should be remembered that measles may follow r  theln and consequently complicate symptoms and diagnosis.

An almost constant accompaniment of German measles is enlargement of the lymphatic glands, especially the post cervical. This adenitis may precede the eruption and often persists for several days after the fading of the rash implicating not only the post cervical glands but the inguinal glands will be found enlarged, if looked for.

TEMPERATURE.

Marked fever is not to be expected in r  theln except when the eruption is delayed. At the onset of the disease we may find a slight elevation of temperature, which ought to disappear in 48 hours. (Bourneville mentions an epidemic attended with vomiting, acute headache, high fever and delirium, but such cases are very exceptional and practically do not enter into the consideration of the disease.)

DURATION.

The duration of the disease is only two to four days, usually the former. The spots ordinarily fade within 24 hours and with the disappearance of the eruption the fever disappears also. At times a slight branny desquamation can be detected over the erythematous patches previously mentioned, but there is no general desquamation as in scarlet fever. Occasionally pigmentation of the skin persists for four or five days, but this is rare, for with the disappearance of the eruption recovery is complete and lasting, though it should be remembered that recrudescence in eight to ten days after the first eruption is possible, though such second attacks appear to be as mild in character as the original attack.

On the other hand, Cheadle reports severe attacks in which there was high fever, serious catarrhal complications, delirium, angina, albu-

minuria and suppuration of the lymphatic glands, and even death from some of these complications. The writer must admit the existence of such cases, having met with them during an epidemic in an overcrowded orphan asylum, but believed them to be largely due to the vitiated air and bad hygienic surroundings. Out of 109 cases, two died from nephritis and three from the exhaustion subsequent to ulcerative stomatitis. Diarrhea and dysentery complicated several cases with tedious recoveries, but was the cause of death in none.

PROGNOSIS.

Extremely favorable except with cachetic children in overcrowded public institutions.

PROPHYLAXIS.

None required. The disease is usually too trivial to deserve quarantine, the more so as this disease, like measles, is contagious before eruption, and quarantine is of little value. Local disinfection is unnecessary.

DIFFERENTIATION.

The differentiation of r  theln is often no easy task, as proven by the widely different views held by various authors as to its existence. In some of its features it resembles respectively roseola, measles and scarlatina, so much so that some think it only a modified form of one of the exanthemata or a hybrid of two of them.

R  theln may be differentiated from roseola by

the fact that the latter eruption has not associated erythematous patches, but consists solely of distinct macules whose color disappears under pressure. Roseola disappears in the course of a few hours, but reappears on the next day or the day after and is not followed by desquamation.

The eruption of rōtheln is polymorphous, persists longer than roseola, is often papular, is accompanied with fever and adenitis, and is followed by slight desquamation. A previous attack of measles or the existence of an epidemic of rōtheln helps greatly in the differentiation. The preponderance of catarrhal symptoms and croupy cough in connection with a careful study of the eruption will help in clearing up the diagnosis in other doubtful cases, especially when it is remembered that the eruption in measles is much slower in making its appearance than that of rōtheln, there being several days of previous discomfort in measles while the onset of rōtheln is sudden and followed in a few hours by the characteristic eruption.

Scarlatina can usually be recognized by the vomiting, high fever, headache, marked sore throat and the general diffusion of its eruption, beginning on the front of the chest, and its bright scarlet tint.

Medicinal roseolæ, such as are produced by capaiba, cubebs, antipyrine, etc., ought not to be

confounded with r  theln, even if mistaken for measles, from which they can ordinarily be differentiated by the absence of all catarrhal symptoms.

TREATMENT.

The disease is so benign that it needs little, if any, treatment. During the febrile stage it is well to keep the child in bed, and if there is fever and sore throat small doses of phenacetin or lactophenin will be found of advantage and pineapple juice pleasant to the child's taste and soothing to its throat.

Complications.—It should be remembered that even German measles may light up a fatal nephritis in previously diseased kidneys. The writer lost two cases in this way some years since. Ulcerative stomatitis may follow this disease, like measles, if many children are kept crowded together in poorly ventilated rooms, and is to be much dreaded as making convalescence tedious and often disfiguring the children permanently. For this complication no treatment has been found so efficacious as fresh air, the free use of alcoholic stimulants and plenty of good food.

CHAPTER IV.

PAROTITIS EPIDEMICA.

SYNONYMS: Mumps, Oreillons, Ourles, Fievre Ourlienne, Ziegenpeter.

DEFINITION: An infectious disease which manifests itself by swelling of the salivary glands, especially the parotids, often secondarily implicating other glandular tissue, such as the testicles, mammae, thyroid, lachrymal and prostate glands.

HISTORY AND ETIOLOGY.

Mumps has been known since the days of Hippocrates, who accurately described the disease and noted the frequency of complicating orchitis, and the usual mild course and favorable outcome of epidemic parotitis. It is doubtful whether the contagiousness of mumps was recognized until about 1775, when Hamilton and Mangor wrote fully on the subject. Nurslings usually escape, and as a rule the disease is milder and less prone to complications with young children than with adults. No age is exempt, but as the disease is usually spread through schools, it is most frequently met with in children from five to fifteen years of age. It is claimed that boys are more liable to it than girls, but this is not the writer's experience.

ETIOLOGY.

Laboratory experiments by Laveran and Catrin have failed to communicate the disease to the lower animals, although one writer claims to have seen a dog afflicted with mumps, which it was thought was taken from a boy who had charge of the dog. Mumps appear in epidemics, which spread chiefly among school children and soldiers in garrisons, irrespective of climate or nationality. Neither does heat or cold or humidity appear to at all influence the spread of the disease. Nor are all equally liable to parotitis, which is much less contagious than measles, scarlatina, or la grippe. Comby notes that he has often seen a case, accidentally introduced into a school or orphan asylum, run its course without isolation was made. It is possible to contract is not highly contagious, it is possible to contract it by sleeping in a bed previously occupied by one suffering from mumps.

Little is known concerning the microbic origin of parotitis epidemica except that its contagion has little vitality outside the human body, and consequently can not be easily carried from one person to another. Hence it is not unusual to see the spreading of the disease from hospital bed to bed, stopped by a glass door or intercepting wall. Capitan (1881) thought he had succeeded in isolating from the blood and saliva the specific

microbe of mumps, and Ollivier and Boinet (1885) described similar microorganisms obtained from the same source, which Bordas (1889) later named *bacillus parotidis*. Laveran and Catrin have elaborately experimented bacteriologically, and believe the pathognomic microbes can be found, not only in the blood and saliva, but also in the fluid obtained from puncture of the testicles and parotids during the course of disease.

PATHOLOGY.

As epidemic parotitis is rarely fatal, there are few recorded autopsies to give us any positive knowledge on the subject. Virchow teaches that the parotid lesions are analogous to those in typhoid, but unlike the parotitis of other infectious diseases, rarely ends in suppuration. Jacob, who made a post-mortem on a soldier who died of edema of the glottis with intercurrent mumps, reports that the parotid glands were found filled with a greenish gelatinous serum which gave the tissue a lardaceous appearance.

Microscopical examination of the parotids by Ranvier gave no inflammatory lesions nor loss of epithelium, nor cellular proliferation. Similar examination of an atrophied testicle as a sequela of mumps showed the tissues to be soft, pale, anemic and the seminal tubes small and fragile and according to Malassez often transformed into cords from increase of epithelial tissue.

SYMPTOMS.

While it may be well theoretically to admit that mumps has a stage of incubation, a prodromal stage and one of typical development this division is of more value scientifically than of practical use, for during the stage of incubation there are no symptoms and the symptoms of the prodromal stage are vague and of no clinical value.

Its incubation is the longest of any of the infectious diseases—usually between 14 and 21 days or even a few days longer, though three weeks may be said to be the general rule.

The first thing that usually attracts attention is slight fever, loss of appetite and malaise with or without chilliness. Redness of the pharynx or enlarged tonsils invariably precede the swelling of the parotids, and earache, on one side or both, is a frequent accompaniment. Headache, nosebleed and somnolence are not infrequent. All of the salivary glands parotid, submaxillary and sublingual may be implicated, but the parotids are the ones chiefly affected and by their swelling give a characteristic stupid look to the face from which appearance the disease probably derives its name mumps, from a Dutch word meaning to mumble or talk unintelligently.

This swelling is painful to pressure and interferes with swallowing and the motion of the jaws, sometimes producing almost trismus, but with-

out the redness of the skin or the heat of erysipelas. Sooner or later both parotid glands become involved, but usually not simultaneously, generally two or three days apart. There is little decided pain except upon pressure, but the swelling may be so great as to embrace the whole neck and extend down to the clavicles. The glandular swelling may be sufficient not only to produce localized edema of the neck, but also of the lids and upper part of the face and dilatation of the temporal veins. This condition is transient, for the parotid swelling comes on rapidly, ought to reach its height in 3 days and disappear entirely in about 8 days, but epidemic parotitis is a disease prone to relapses and in some cases resolution of the glands is exceedingly slow.

Submaxillary swelling is next in frequency and may entirely take the place of the ordinary parotid enlargement or may persist in the submaxillaries after it has left the parotids. Sublingual mumps is still more infrequent. As has already been noted, redness of the pharynx and tonsils accompanies mumps and like erythema may attack the buccal mucous membrane constituting the "stomatite ourlienene" of Guinean which is attended with acid salivation, putaceous patches and a disagreeable breath.

Fever is usually moderate in range, but may be attended with anorexia, increased thirst, vomit-

ing and various nervous disturbances such as insomnia, night terrors, delirium and very rarely convulsions. Ordinarily the disease runs an uncomplicated course and sound children ought to reach convalescence in a week, although relapses due to imprudence are not uncommon. In a typical case the enlarged glands ought to quickly return to their normal size in about a week, leaving no induration nor inflammation behind. Suppuration is very exceptional, being always due to secondary infection which might have been prevented by better antisepsis.

COMPLICATIONS.

Orchitis in the male and ovaritis in the female are the complications chiefly to be dreaded, but these are fortunately infrequent with young children. After puberty it is different, when mastitis may be met with in both boys and girls. Dysentery and peritonitis are exceptional, but possible.

Inflammation of the thyroid or lachrymal glands have also been noted, but these do not ordinarily proceed to suppuration. The same is true of the lymphatics of the neck which are apt to become swollen and of slow resolution in scrofulous children, but are without serious import.

The possibility of a grave nephritis following mumps should be kept in mind, for, according to Catrin, albuminuria was found in 30 per cent of

his cases and anasarca may subsequently appear. Ascites and haematuria have been noted in other cases, but death from renal complications is fortunately rare in parotitis epidemica. Rheumatic pains with or without attending peri- or endo-carditis may occur in children who have previously suffered from rheumatism, but these complications disappear with the disappearance of the mumps even more rapidly and completely than the analogous rheumatic complications of scarlatina.

The nervous system is sometimes seriously poisoned by the toxins of mumps, especially in neurotic children. Convulsions and meningitis are the most serious of these, though insanity and dementias as sequelae of epidemic parotitis are noted by Comby as prone to occur in cases complicated with orchitis. Some of these lesions, as aphasia or various paralyses, may persist long after other recovery, analogously to the paralyses of diphtheria. Eye complications such as conjunctivitis, paralysis of accommodation, dacrocystitis are possible, but infrequent; the contrary is true of ear troubles, for earache, deafness, vertigo, buzzing in the ears are to be expected in most cases and in some cases permanent atrophy of the aural nerves is the final result (Roosa).

This possibility should be borne in mind even in mild cases and the further possibility of extension from the middle ear to the meninges of

the brain will doubtless explain the cases of meningitis which follow parotitis. H. F. Harris in a recent article in the Boston Medical and Surgical Journal reports a case of diabetes mellitus directly following an attack of mumps. From the close analogy in function of the salivary glands and pancreas it is at least thinkable that pancreatic diabetes may result and this may explain some otherwise inexplicable cases of diabetes in children.

Excessive vomiting may seriously delay recovery and even lead to fatal results.

Hemorrhage from the eyes (bloody tears) and ears may occur and epistaxis is not infrequent.

DIFFERENTIATION.

The differential diagnosis of a given case of mumps is not always easy without the presence of an epidemic at the same time. This is made more difficult if the submaxillary and cervical glands are equally or more implicated than the parotids; in which case the diagnosis must be established by full clinical history, remembering that mumps is a disease of short duration, and its swelling is more symmetrical than that of adenitis. Other forms of parotitis are generally unilateral, harder, more painful and as a rule terminate in suppuration. Such glandular swelling can be usually referred to some previous affection of the face or ear or throat, which latter often gives rise to lymphatic engorgement at the angle of the jaw,

which could easily be mistaken for mumps. It need hardly be added that the old wives' pickle test is of no value and generally fallacious.

PROGNOSIS.

Mumps is usually regarded as a trivial disease and fatal cases are exceedingly rare. On the other hand it should be remembered that epidemic parotitis may have behind it irreparable injuries such as permanent deafness, atrophy of the testicles or chronic ovarian disease, though the tendency to such complications increases with the age of the child. Death has been reported from gangrene of the parotids, cervical abscess, acute nephritis or meningitis subsequent to mumps

PROPHYLAXIS.

Mumps is ordinarily so mild a disease with children that it is doubtful whether it is desirable to attempt quarantine. If isolation is attempted it should be remembered that the disease is contagious even before the swelling of the parotids, and that quarantine to be effective should be continued for 25 or 30 days. Roth believes the contagion may be carried on clothing, soiled linen, bedding, etc., and hence advises local disinfection before further use of the rooms in which those sick with the mumps have been confined.

TREATMENT.

Since the disease has usually a mild and self-limited course little or no medication is required in ordinary cases. With children the rest and warmth of a bed is desirable, but not absolutely necessary except during the stage of feverishness. The loss of appetite, coated tongue and sluggish bowels rarely call for anything more active than cascara, or small doses of calomel followed by citrate of magnesia and light diet. Soups, broths and bread and milk are most easily swallowed and should be advised to the exclusion of meat on account of possible kidney complications. Antiseptic gargles or sprays diminish the probability of later ear troubles, especially where there is coincident angina.

Where there is restlessness or fever, lactophenine will be found useful, especially in cases with threatening meningeal complications. Antipyrine is valuable when prompt reduction of temperature is necessary. Small doses of antefebrein will often relieve earache where local applications have failed.

Poulticing or rubbing the swollen parotids is worse than useless; the best treatment is to let them severely alone, or cover them lightly with cotton-wool held in place by an appropriate bandage.

Orchitis demands absolute rest in bed, elevation of the scrotum on a pillow or pad and the use of warm fomentations, one of the best of which is made with aconite leaves and ammonia muriate. Resolution may be later assisted by a lead wash or the use of the iodide of lead ointment.

CHAPTER V.

PERTUSSIS.

SYNONYMS.—Whooping cough—or hooping cough, *Tussis quinta*, *Tussis convulsiva*. Probably the *bex theroides* of the Greek physicians, *Coqueluche*, *Blauhusten*, *Pertosse*, *Tos ferina*.

DEFINITION.—A self-limited, specific, contagious, bronchial and pharyngeal catarrh characterized by paroxysmal cough, terminating in an inspiratory “hoop” and the expectoration of a tough, glairy mucus, with or without vomiting at the same time.

HISTORY.—According to Comby, the French name for pertussis (*coqueluchon*), was originally applied to the harassing cough of *la grippe*, from which the disease was not differentiated until 1578. Thomas Willis (1682) was the first English writer to give a good description of pertussis and to insist upon its contagiousness, which honor he perhaps ought to share with Sydenham.

ETIOLOGY.—Whooping cough is met with in all climates and in every season, elsewhere flourishing best in summer and fall, while in this country spring and winter seem to be its favorite seasons. The disease is very prone to follow epidemics of measles. As a matter of fact, pertussis is epidemic

in all of our large cities, and, except with infants, not as fatal as in certain of the noted epidemics of previous centuries, notably those of Copenhagen in 1767 and of Sweden and Norway two years later.

No age is exempt from pertussis. White reports a case in a woman past 80, and Rotch believes that it can be contracted *in utero*. As a rule one attack protects from a second, but repetition is certainly possible, although even rarer than in measles or typhoid. It is especially a disease of infancy, frequent among infants, rare with adults and rarer with the old. Sex probably has no influence upon the disease. Contagiousness is great, a chance meeting, a few moments conversation, or a seat next to the sick child is generally sufficient to convey the disease, which may also be carried upon linen, or clothing soiled with the expectoration of one suffering from whooping cough.

PATHOLOGY.

Aside from its bacteriological, there are no characteristic lesions of pertussis. Its pathological findings are those of its complications, which are many and various. Among these may be mentioned congestion of the lungs, heart, kidneys and meninges of the brain. Broncho-pneumonia, atelectasis and emphysema are by no means rare and heart strain occurs more frequently than is often suspected. Hemorrhages into the various organs

may take place from the violence of coughing. Bronchial adenitis always exists.

It is generally conceded that a microorganism is the exciting cause of pertussis, but its natural history has not yet been definitely settled, although since 1867 bacteriologists have at short intervals been discovering the alleged peccant microbe. Poulet ('67), Letzerich ('70), Tschammer ('76), Burges ('85), and Afanassiew ('87) have all laid claims to this honor, the latter naming his microbe the *bacillus tussis convulsiva* on the strength of the fact that the injection of this microbe into the trachea of dogs produced a whoopy cough, bronchitis and broncho-pneumonia. When we were just ready to admit the conclusions of Afanassiew, Ritter and Galtier ('92), disturb our peace by declaring that the cause of pertussis is not a bacillus at all but a diplococcus, which conclusion seems to be later reversed by those of Cohn and Neuman, who with Griffiths believe that a special ptomain is the cause of all the trouble. The latest utterance on the subject is that of A. Cavasse, who has studied the bacteriology of 330 cases and obtained negative results from the blood, urine, tracheal and bronchial ganglia and cerebro-spinal fluids. Staphylococci and streptococci were found in the liver and spleen and the latter in the medulla. Pneumococci and pneumobacilli were found in the pulmonary fluids. In the sputa,

in every case, were found the "polar bacteria of Czaplewski, which, however, failed to produce the symptoms of pertussis when inoculated into the lower animals. "La bacteriologic ne pas encore dit son dernier mot." (Says Comby.)

Incubation.—The period of incubation, or that elapsing between infection and manifest symptoms, is fixed by most writers at 7 to 8 days. Gerhardt says it is often not longer than 2 days.

SYMPTOMS AND COURSE.

The earlier division of pertussis into three stages, viz: stadium incrementi, stadium nervosum, stadium decrementi is still a good one. The first stage, generally known as the catarrhal period, follows the course of an ordinary cold for about two weeks. Except for the fact that it is not amenable to ordinary treatment it can not be distinguished from a cold until the cough becomes characteristic and is attended with a slight evening rise of temperature. Up to this time a positive diagnosis is impossible, but the typical cough is conclusive and is well described in the Latin of Willis as "tussis convulsiva, strangulans cum inspiratione, sonora, iterata, saepe vomitus." * * *

These attacks are due to spasm of the glottis and last until there is sufficient carbondioxide accumulated to relax the muscles of the glottis and allow the child to expectorate or vomit the mucus

which has been the exciting cause of the paroxysm. The number of these paroxysms varies from two or three to fifty or more in a day and when pronounced leave the child exhausted and prone to sleep. Sudden changes of temperature, dusty air, anger, laughing, sneezing or haste in eating will precipitate such an attack, which can also usually be induced for diagnostic purposes by deep pressure with a finger at the angle of the jaw. A closer examination of the whooping cough paroxysm will show that it begins with a series of short, dry, expiratory coughs quickly following one another until concluded by prolonged whistling inspiration, due to a narrowing of the chink of the glottis. The child, in its efforts to obtain more air, seeks a fixed support, either by bending forward and placing its hands upon its knees, or the same result is obtained by clutching firmly some stable object or by holding the chin between the hands, placing the elbows on a table or window seat to enable the respiratory muscles to work to their greatest possibilities. Until the spasm passes there is increasing lividity of the face and hands (*blauhusten*) with stagnation of circulation, thus forcing increased pressure on the right heart. Ecchymosis of the eyeballs, hemorrhage from the nose and even from the ears, incontinence of urine or feces, and hernia may occur from the straining produced by pertussis. The period of paroxysmal cough

lasts from 4 to 6 weeks and in favorable cases gradually diminishes in intensity instead of coming to a sharply defined, critical termination. Hence in any given case it is difficult to say when convalescence begins or when it is safe to give an entirely favorable prognosis. So much as this is certainly true, we ought by the end of the sixth week in an uncomplicated case to find the paroxysms diminishing in number and intensity and the general condition of the child improving, both as regards color, appetite and better sleep. It should be remembered that pertussis is extremely prone to relapses, possibly due to accompanying bronchial adenitis. At all events these are to be watched for in the second and third stages and guarded against as much as possible, especially the much dreaded complication of broncho-pneumonia.

COMPLICATIONS.

The frequent occurrence of albuminuria during the course of pertussis has not escaped the attention of those who have had much to do with hospital cases of this disease. Albuminuria closely coincides with the severity of the paroxysms and *pari passu* disappears with convalescence, hence we may legitimately infer that its existence depends upon a mechanical congestion of the kidneys due to the violence of the cough and as might be expected the amount of the albumin in the urine varies from day to day, or may be absent for a day and reappear with a fresh exacerbation of the disease.

Paralyses are among the infrequent complications, but Leroux has collected 38 such cases, chiefly in children under five years of age. Like albuminuria, these are only met with in the acute stage and are often the result of some complicating infectious disease like influenza, pneumonia or scarlatina. The paralysis generally follows convulsions and coma, but may develop slowly as a hemiplegia or monoplegia, due to a cerebral hemorrhage.

Buccal ulcers are among the minor accidents of pertussis and are produced by a chafing of the tongue against the lower teeth with ulceration of the frenum in consequence. This simple accident, as it is in most cases, may assume a diphtheritic character, extend and give rise to hemorrhage of a grave nature.

Broncho-pneumonia is the most serious and the most frequent of the complications of pertussis, since the disease is always attended with bronchitis, usually of a mild type. But this bronchial irritation is always ready to pass into broncho-pneumonia with slight exciting cause. The differentiation between capillary bronchitis, lobular broncho-pneumonia and pseudo-lobar broncho-pneumonia, all of which may complicate the disease, is hardly possible to make during life and of little practical importance but may be always suspected when the temperature rises, the paroxysms diminish

and dyspnoea appears, even if auscultation does not give confirmatory proof. Broncho-pneumonia may run a rapid and satisfactory course, except in infants under two years, or it may persist indefinitely, become chronic and finally result in emphysema. More or less compensatory emphysema always accompanies the broncho-pneumonia in pertussis and as a rule disappears at the same time as the other pulmonary lesions, but it may persist. Pleurisy is comparatively rare and the same is true of pericarditis, but mechanical dilatation of the right side of the heart is quite frequent and may be permanent. Convulsions are frequent with young children under two years, with older children aphasia, hemiplegia or sudden blindness are possible. Neuritis has followed pertussis. Anorexia, malnutrition, multiple abscesses or septic infection may delay convalescence.

Differentiation is very difficult before the whooping appears, but an obstinate cold with persistent cough may justly awaken suspicion, but it should be remembered that chronic pharyngitis, enlarged tonsils or bronchial adenitis may produce a spasmodic cough closely simulating pertussis.

PROGNOSIS.—The younger the child, the worse the prognosis. With city infants pertussis is one of the most fatal diseases. Continued lassitude, peevishness and anemia are always unfavorable symptoms. Convulsions are to be looked for in

rachitic children, who occasionally die during a paroxysm, but not as often from convulsions as might be expected. Caseous degeneration of the bronchial glands is a possible sequela and should always be suspected when the paroxysms persist after the eighth week, or the child is of a tuberculous family or has suffered from a previous attack of the measles. Broncho-pneumonia is the most to be dreaded of all complications for, as Comby puts it, nine out of ten of the deaths in infants suffering from pertussis are due to broncho-pneumonia. An intercurrent infectious disease diminishes the frequency of the paroxysms but increases the danger to the child's life.

Mortality in very young children is frightful. Rogers' statistics show 11-16 of his patients under 2 years succumbed to the disease. Holt says fully two-thirds of the deaths from whooping cough occur during the first years of life. Between 8,000 and 10,000 children die annually in the United States from whooping cough, which stands either at the head or next to the head of infant mortality in the vital statistics of all our large cities. After the fourth year death either from pertussis or its complications is rare (Holt).

TREATMENT

may appropriately be divided into hygienic and medicinal, the first of which is always the more important, if we remember that whoop-

ing cough is essentially a siege of eight to twelve weeks against the vitality of the child. No method has yet been discovered whereby the microbic hosts may be safely dislodged, but much can be done to preserve the strength of the child during their prolonged attack. *Pure air* is an essential part of the treatment of whooping cough. When the season is such as will permit, the child should be kept in the open air the larger part of the day. When the weather is inclement two rooms should be devoted to your patient in order that one room may be aired and warmed while the child is kept in the other and as often as feasible carried from one to the other. Siebert of New York advocates the treatment of the child during the entire course of the disease in a room with windows kept wide open and claims rapid improvement by this method, whatever the season of the year. So far as we know this has never been tried on a large scale, but the variations in Chicago temperature are so rapid that we should hesitate to make the experiment, unless it was otherwise impossible to procure sufficient oxygen to counteract the pertussis toxins.

Sufficient food and systematic feeding stand second in our list of resources. Unless this is done, the child wastes, as it usually loses part of each meal by the repeated vomitings. This loss should be immediately made up by feeding as soon as

possible after vomiting. Eggs, beef juice, broth, cocoa, as well as milk should be used and rectal alimentations resorted to if necessary.

Medication.—As yet no specific for pertussis has been discovered. Perhaps some later investigator will discover an antitoxin efficacious to check the disease, but for the present palliative remedies are our main reliance. Of these a host, from belladonna to formaldehyde, have been loudly proclaimed and all, so far, found to have limited value and use. For instance, antipyrine has undoubted value in checking the number of the paroxysms, but the drug has too depressing effects for continued use with a heart already sorely taxed by the paroxysms of coughing. Bromoform has similar value, but has more than once produced cyanosis and other toxic symptoms closely resembling chloroform poisoning. The pungent taste of bromoform makes it difficult of administration to children and it is prone to separate from emulsions so that in the last dose from the bottle a poisonous amount may unintentionally be given; but with all these drawbacks it is a valuable remedy and may be conveniently given as follows:

R.—Bromoformgtt. 12

Sp. vin. rectific., q. s. to hold in solution,

Emuls. amygd. dulcis.....fl.oz. 3

M.Sig.—Teaspoonful for dose to child of five years.

Belladonna, once highly esteemed, is of value if pushed to the limits of physiological tolerance. Other remedies may be found of equal or greater value and much safer. The German method of using the powdered root in 1-10 to 1-6 of a grain gives positive results if pushed until it produces dilatation of the pupils and dryness of the throat. Hyoscyamus, conium and opium have been used with good results but are dangerous drugs for continued use with young children. Chloral hydrate, especially when combined with the bromides, is the best of the sedatives when necessary to induce sleep. Codeine and syrup of lactucarium will relieve the cough when frequent and harassing.

Sprays and Vapors.—The use of an antiseptic spray, such as a 2 per cent solution of resorcin, or carbolic acid, materially shortens the paroxysms when used with a hand bulb atomizer at the onset of an attack. Cresolene, when vaporized over an appropriate lamp, is an excellent home substitute for the gas house treatment so popular in many of our large cities, but do not be tempted as the writer was once into trying the inhalation of ordinary illuminating gas in pertussis. This was tried on quite a large scale in an orphan asylum and accomplished nothing except adding an annoying crop of boils to the other troubles of these children. Formalin is the latest of local remedies and may be used as 1 per cent spray

(Hinman), or 5 per cent solution for topical application (Olliphant). Theoretically, the remedy ought to be of value, as it is a most efficient antiseptic. Dr. Olliphant of New Orleans claims that "it is as much of a specific for pertussis as mercury is for syphilis and that by the use of the local application of formalin the course of the disease may be shortened from six weeks to six days." Another writer in the St. Louis Medical Review claims to have cured with this remedy seventy-five out of a hundred cases in less than ten days. But it should be remembered that formalin is irritating and that like hopeful claims were made in former years for laryngeal insufflation of quinine. Morris advises the local use of cocaine to the ear drums.

Prophylaxis.—Simple justice to others demands that the child afflicted with whooping cough should be kept from school and isolated for a period of not less than ten weeks from the initial cough. If convalescence is retarded, quarantine should last even longer than this. On purely theoretical grounds it can be predicted a pertussis vaccine will sooner or later be discovered, but as yet the discovery has not been made and the Jenner of pertussis is unknown, perhaps unborn. There has been much discussion as to the duration of contagiousness in pertussis. It is conceded that the disease is most contagious during the whooping stage and generally believed that the

premonitory catarrhal stage is hardly less so, hence the great difficulty of efficient quarantine in pertussis. Comby fixes the limit of quarantine at two months.

If Olliphant's claims are well grounded, formaldehyde ought to be the best of all disinfectants for rooms and clothing used by pertussis patients. The formaldehyde lamp is a very convenient method of using the same as it never discolours clothing or tarnishes metal as do the sulphurous acid fumes.

CHAPTER VI.

VARICELLA.

SYNONYMS.—Chickenpox, Swinepox, Verolette.

DEFINITION.—An extremely contagious, microbic, eruptive disease with little systemic disturbance, but characterized by a typical vesicular eruption without suppuration or sequelæ in uncomplicated cases.

HISTORY.

Until 1761 varicella was thought to be a modification of smallpox and no attempt was made to differentiate between the two except as to danger and probable complications. Dr. Herberdy made the first accurate differentiation between the two diseases, and although this was nearly one hundred and fifty years ago, curiously enough there is yet wide variation in the statements of various authors regarding many of the essential facts concerning its etiology, relation to smallpox and even such matters as its stage of incubation, which is given from four days (Tanner) up to twenty-five (Trousseau).

There must be other explanation than carelessness when such men as Bristow and Dukes vary ten days in the time of incubation. The explanation probably lies in the fact that the time of incubation is modified both by the personal resist-

ance of the child to the poison introduced and also by the virulence and amount of poison introduced at the time the disease is taken. Modern methods of ventilation and hygiene ought to attenuate all microbic poison and hence we find modern writers giving a longer incubation than those who wrote when school hygiene was unknown.

ETIOLOGY.

The theory that varicella is only an attenuated or modified smallpox can not be maintained in the light of such facts as the following, narrated by J. Comby: "I saw in 1885 in the smallpox pavilion of the Hospital St. Louis, of which I had charge, a mother and her babe, admitted by mistake as having variola, into the ward reserved for that purpose. As a matter of fact, as proven only too well by subsequent facts, both were suffering from varicella, and after their recovery from that disease both contracted variola from which the infant, who had not yet been vaccinated, died."

Furthermore, an attack of varicella does not confer immunity from variola, nor does vaccination confer immunity from varicella, nor does an attack of varicella interfere with coincident vaccination. Varicella is a disease of childhood, though adults who are not protected by a previous attack, may contract the disease from children suffering from the same. Nurslings rarely take chicken pox, but perhaps this is due to their comparative isola-

tion rather than inherent immunity. The disease is spread chiefly through creches, dispensaries and schools, especially the latter. Varicella is very contagious especially at its onset when it is easily conveyed by direct contact or by third parties or objects—possibly by the atmosphere alone.

BACTERIOLOGY.

The bacteriology of varicella is as yet incomplete. We do not know whether the scales and crusts of varicella carry contagion, but this much seems certain, viz.: that the micro-organism of varicella has feeble vitality outside of the human body.

Further than this we know that varicella gangrenosa is due to mixed infection, streptococci or staphylococci being ingrafted upon the original lesion. These areas of gangrenous infection may be an inch or more in extent and the reabsorption of toxins sufficient to cause convulsions and death. This form of varicella may cause hematemesis and hematuria, and death is the usual result.

Second attacks of varicella are very exceptional, but recrudescence is possible after the usual period of incubation.

SYMPTOMS AND COURSE.

Continental writers conveniently divide the disease into four stages, viz.: incubation, invasion, eruption and desiccation.

Stage of Incubation: It probably lasts about

two weeks, though D'Heelly's experiments in inoculation, if accurate, show that it varies from 3 to 17 days. During this time the child is not sick and hence is rarely under the observation of a physician.

The *Invasion Stage* is brief, as is shown in the temperature chart of an ordinary case of varicella.

As seen from the above, a rapid elevation of temperature ushers in the disease, but this elevation rarely lasts more than 24 to 48 hours, dropping with the development of the typical vesicles. Often there is so little general disturbance that the child continues to attend school without suspecting that anything is wrong until the vesicles are found on the face or back.

On the other hand, there is sometimes a more violent stage of invasion, which is attended with fever, headache, backache, vomiting and even convulsions, making the diagnosis at first difficult, if not impossible. These prodromata are transient and disappearing with the appearance of the rose-red spots or papules which precede the typical eruption of varicella.

Eruption: It should be remembered that the typical vesicles or varicella may be preceded by a puzzling scarlatiform or measly eruption. (Demmie, Gillett, etc.) The eruption of varicella appears impartially upon the head, back and chest. There are vesicles to be found

on the pharynx, and scalp and more sparingly on the arms and legs.

The point in which the varicella eruption differs from all others with which the writer is acquainted is the commingling of vesicles of all ages which, after the second day, can be detected upon the chest and back. Instead of having a coincident life history as is the case in variola, varioloid, or vaccinia, we find in varicella minute pin-point vesicles, full developed vesicles, vesicles with sero-purulent contents, ruptured vesicles and the brownish-red stains all on the same child. It is this commingling of vesicles of all sizes and ages that chiefly aids us in our differentiation of the disease.

Ordinarily the vesicle is not larger than a small pea, but in cachectic children it may constitute a bulla, as large as a grape. The vesicles have no regularity in their appearance and rarely coalesce. At first they are as translucent as glass, but by the second day after their appearance this clear liquid grows slightly turbid and then transforms itself into the contents of a pustule, which ruptures or dries up, and leaves a reddish-brown stain behind. Varicella pustules may show umbilication, but do not usually do so.

Where the skin is thick and tough, as on the soles of the feet and on the palms of the hand, the vesicles are larger and often painful. Itching, especially about the vesicles in the hair, is often

aggravating and in consequence diagnosis is apt to be hindered by nail marks, which often become infected and may cause sepsis.

In an ordinary case of varicella the eruption ought not to persist more than a week. It should be remembered, in this connection, that the mucous membranes of the nose and pharynx may participate in this eruption. This vesiculation in the mouth is brief and leaves behind small erosions with a yellowish white floor and rose-red rim. Usually this escapes attention, but in infants it may constitute a veritable stomatitis sufficient to interfere with feeding and thus retard recovery.

Like lesions may sometimes be found on the conjunctiva of the eyelids, eye-ball or the cornea producing a keratitis with serious results. Similar vesiculation may occur on the prepuce or vulva and produce a muco-purulent discharge. Bonchesaro published a fatal case of laryngeal varicella in 1893 and subsequent cases reported by Marfare and Halle seem to establish the possibility of mistaking such cases for diphtheria even by skillful diagnosticians.

Stage of Desiccation: There is no fixed time for the beginning or close of dessication, since each vesicle seems to be a law unto itself in the matter. It often begins on the second day and should terminate within a week by the falling off of a thin, grayish-black crust. This should be accomplished

without the suppuration, met with in variola, or any disturbance to the patient, the only sequela being a transient brownish pigmentation left behind the scab, after it drops off.

COMPLICATIONS.

The complications of a case of varicella in a well-cared-for child ought to be like the number of snakes in Ireland. Nevertheless, other troubles, as sepsis, or impetigo, may become engrafted upon the trivial vesicles of chickenpox and convert it into a serious and lingering illness. It has been my fortune twice in the overcrowded wards of an orphan asylum to have the vesicles of varicella assume a gangrenous form with localized sloughing and very tedious recovery. Multiple abscesses and general septicemia have been reported by others, due probably to scratching with infected fingernails. Dr. Hulot's case died of septic pneumonia, and septic arthritis, and endocarditis are on record as complications of chicken pox.

Again the course of varicella may be complicated by the intervention of some of the other eruptive diseases. Comby, for instance, mentions a case of measles on varicella supervening, where the temperature persisted high for an unusual length of time, but where recovery took place in about the usual time for the intercurrent disease.

It would seem from Gray's unique case that a neuritis with transient paralysis of the lower limbs

may follow varicella. Recovery took place in three weeks. Henoch has seen and reported several cases of nephritis following varicella. Varicella is considered so trivial a disease that uranalysis is rarely made, but according to Unger albumin can usually be found, if the examination is made about the time of the fading of the eruption. Recovery usually takes place in a few weeks. Messenger reports a case of hemorrhagic varicella with ecchymoses, epistaxis, and hematuria. Death on the seventh day.

DIFFERENTIATION.

Ordinarily the differentiation of varicella presents no serious difficulties to the attending physician. Exceptional and irregular forms are, however, very puzzling, especially when attended at their onset with high fever and erythema. In some cases, time alone can bring certain diagnosis, but while waiting for what it has to reveal to us it is well to remember that chicken-pox is a child's disease, so much so that the probabilities are against our meeting with it in adults. The exact contrary is true of smallpox, which we ought to suspect in the adult, unless we have positive knowledge as to exposure to varicella, and even then variola ought to be given the benefit of the doubt.

The difficulties of differentiation between varicella and variola are greatly enhanced when we have to do with the modified forms of the latter

as found after vaccination, but it should never be forgotten that the eruption of varicella is after the second day *sui generis*, in the fact that vesicles of all ages may be found associated on the patient, whereas variola vesicles show the same stage of development. Furthermore the initial papules of smallpox are hard and red and more resemble acne than they do the early translucent vesicles of varicella. After varicella vesicles have been scratched and infected with impetigo the diagnosis is more difficult, but even then scattering typical vesicles can usually be found.

The differentiation between chicken-pox and vesicular urticaria is a matter of little importance, as they are both trivial diseases, and in the case of the urticaria the typical wheals of urticaria may be found elsewhere in connection with the vesicles.

Acute pemphigus of the new-born resembles in many respects varicella, but in the former there is no accompanying exanthema of the mouth or nostrils.

After all, the real danger and difficulties of diagnosis lie along the line of the confusion of modified smallpox (varioid) with chicken-pox, further differentiation of which will be attempted in the section on variola and vaccination; therefore nothing more need be said on the subject at this point except to remark that the umbilication or non-umbilication of the suspected vesicle is of

little diagnostic value. To be sure, as a rule umbilication is not found in the chicken-pox vesicle, but this is not an invariable rule and cannot be relied upon with safety in diagnosis.

PROGNOSIS.

Extremely good except in very young and cachectic children or those confined in overcrowded hospital wards. Uncomplicated varicella always gets well and in the experience of the writer the complicated cases do the same if they can be removed to more favorable surroundings. It is but fair to add that he never has been unfortunate enough to have a case complicated with purpura, nephritis or paralysis. For the sake of the child it is necessary to remind the mother that chicken-pox vesicles, if scratched and infected, will as surely pit as those of smallpox. Permanent eye trouble may follow septic infection of conjunctival vesicles.

TREATMENT AND PROPHYLAXIS.

The treatment of uncomplicated varicella is so trivial that it needs no extended discussion. A mild laxative to correct the confinement to the house, some antipruritic powder, such as Anderson's, of camphor, oxide of zinc and starch, and a few days quarantine are all that are necessary.

It is well to keep younger children in bed until the initial fever is over, and plenty of lithia lemonade or buttermilk will diminish the dangers of

complicating nephritis, which should be watched far more carefully than is usual.

Where the itching is great it is well to tie the hands of young children if you desire to prevent the scratching and pitting their faces.

Collyria of boracic acid, diluted sulphate of zinc (1 to 100) and sulphate of atropine when required may anticipate later eye trouble. Gangrene and sepsis should be treated as elsewhere. The French authorities insist on 25 days quarantine before returning to school. This is doubtless longer than is necessary in most cases.

CHAPTER VII.

VARIOLA.

SYNONYMS.—Smallpox, Variola vera, Pocken, Blatten, Varioles, "Cuban itch."

VARIETIES.—Discrete, confluent, purpuric, malignant, modified (varioloid).

HISTORY.

Earliest Chinese history proves that the disease has been known to that nation since it has had a written history, or more than 2,000 years, and it is still epidemic among the Chinese people. From the East the disease spread over Europe, and was for many years the most dreaded and constant of epidemics. Formerly it was confounded with syphilis (great pox), whence its popular name of smallpox. The story of Jenner's discovery of vaccination need not be repeated here, nor the practical value of compulsory vaccination be enlarged upon further than to say that before Jenner's time, three out of every four persons contracted smallpox and of these 30 per cent to 50 per cent died and the remainder were left scarred and disfigured for life. Nowadays a pock-marked person is a rarity and death from smallpox is scarcely known.

IMMUNITY.

Natural immunity is rare but seems to be proven by certain unvaccinated persons escaping the disease after repeated exposures. Second attacks are

very infrequent, but the writer has seen such an attack after inoculation 20 years previous.

ETIOLOGY.

A woman who contracts variola during pregnancy, usually aborts and may give birth to a fetus marked with variolous pustules (such a specimen may be found in the museum of the N. W. U. Medical School, Chicago). On the other hand, Comby states that a mother suffering from smallpox may be delivered of a healthy infant "possessing a sort of temporary immunity from the disease." Kaltenbach reports a more remarkable case of a woman who gave birth to triplets, two of whom had a typical smallpox eruption, while the third was perfectly sound and remained so.

On the other hand it is possible for a child to be born from a woman suffering from smallpox and the child show no evidences of the disease at birth, but in two or three days, or a week, or even later, have the typical eruption make its appearance. It seems to be definitely settled that the contagion of smallpox may be found in the contents of the pustules and the scabs which are left after the dessication of these pustules. This virus is both inoculable and extremely contagious, retaining its vitality for weeks and months.

Babes and Coriot have figured chains of micro-organisms which can be detected in the fluid found

in the smallpox pustules, but the evidence is not yet complete that these are the sole cause of the disease.

The virus of smallpox is probably not volatile, but can be carried short distances by the air, though it is usually conveyed by means of clothing, infected rooms or soiled furniture. The germs probably enter the system by respiration, though they can also be introduced by inoculation, as was formerly practiced as a substitute for vaccination.

Pathological Anatomy.—The first changes noted in the skin are reddening and swelling due to arterial and lymphatic congestion. The cells of the mucosa and Malpighian layers of the skin become turbid and the cells of the cutaneous layer are raised, giving way for the formation of a reticulated cavity which is first filled with a clear liquid, then turbid and later purulent. In this fluid can be found leucocytes and red corpuscles and the zooglea of Babes. The formation of a pustule produces an inflammatory reaction around itself, attended with an edematous swelling, which is succeeded after desiccation of the pustule by pitting or an irremovable cicatrization.

Confluent smallpox affects the internal organs and fills them with colonies of septic bacteria; the liver becomes enlarged, soft, yellow and fatty. The lungs, kidneys, spleen, brain are all congested and the heart hypertrophies and its musculature

may undergo fatty degeneration. The blood is dark and loaded with microorganisms and if the case is hemorrhagic in character we may find effused blood in the serous cavities, purpuric spots on the skin and ecchymoses in the tissues.

SYMPTOMS AND COURSE.

Like other microbic diseases, smallpox is usually divided into four stages, viz., those of incubation, invasion, eruption and pitting. We shall attempt a discussion of these only in so far as they differ somewhat in the child from those of the adult.

Incubation.—The period of incubation is the same for the child as for the adult, viz., from 10 to 12 days, depending upon the virulence of the poison introduced and the general condition of the child at the time.

Invasion.—The invasion of smallpox is generally attended with marked disturbance shown by high fever, chill, or convulsion, if the child is young and the temperature is high. Backache is not usually as violent as in the adult, and in children of neurotic tendencies we find delirium. With all unvaccinated children there is marked disturbance of the nervous system, betokening some serious disease, and as with scarlet fever, there is a foudroyant form of variola attended with the gravest cerebral and spinal symptoms, sometimes showing itself in paresis of the lower limbs.

The urine is scanty, high colored and contains ptomaines. This stage of invasion lasts from two to four days, usually the former, and at its close the rash appears. At first this is simply an erythema or morbilliform eruption—even purpuric—and may cover nearly the entire body, though found chiefly on the face, buttocks, thighs and abdomen. The close of the stage of invasion is marked by a fall of temperature to nearly normal.

Eruption.—The eruption in unmodified small-pox is one of the most characteristic known to medicine. It begins as a macule, or round, reddish spot, on the skin, which soon elevates itself into a papule. This requires about twenty-four hours, then during the second day the papule becomes surrounded with a minute transparent vesicle, which at first can be seen only with a magnifying glass. On the third day the contents becomes turbid, and thus the vesicle is surrounded with a hard, red base, changing into a pustule.

These pustules are not uniform in size or shape; the largest ones being found where the skin is thickest, as on the nucha, the hands and soles of the feet.

Vigorous children develop well-defined pustules, while in feeble ones pustulation is imperfect. If the pustules are scattered we call the eruption discrete and expect to find areas of sound skin between them. Again, the vesicles may be bunched

together into clumps and rows or bands. This is apt to occur where there has been superficial pressure or irritation, as from a belt, or chafing; or again we may find the pustules joined closely together, so as to constitute what is known as confluent smallpox.

In addition to the skin, smallpox attacks also the mucous membranes. The mouth is implicated and pustulation of its mucous membrane produces copious salivation. The vesicles in the pharynx cause dysphagia, and if they invade the larynx may cause aphonia, dyspnea and mild edema of the glottis. The eyes and nose are similarly attacked and ulcerate.

About the eighth day the eruption of smallpox ought to reach its height and about this time the fever, which dropped at the time the eruption made its appearance, reappears (suppuration fever), varying in intensity with the amount of suppuration in the variolous pustules. In those children who have previously been vaccinated, the fever of suppuration is insignificant, pustulation passing directly to desiccation without general septic infection. On the other hand in grave cases, about the tenth day salivation sets in, the face, feet and hands swell and the patient dies usually with colliquative diarrhea.

Desiccation.—This is an irregular process for suppuration in all the pustules does not cease as

early as the tenth day, but may be prolonged to the twelfth and fourteenth at isolated points. As the pustules dry, they become covered with thick, irregular crusts, or scabs, which a few days later if left to themselves will fall off and be replaced by others thinner and lighter. This process may be repeated three or four times, lasting two, three or even four weeks.

VARIATIONS IN THE ERUPTION.

Variations in the appearance of the variolous eruption have already been alluded to. In addition to the discrete and confluent forms previously mentioned other writers speak of a coherent form, less grave than the confluent and the hemorrhagic or purpuric variety, which has the gravest prognosis. This form is fortunately rare with children. There is also a pseudo-hemorrhagic in which the hemorrhage does not occur until after the formation of the pustules. Varioloid is variola modified by vaccination.

DIFFERENTIAL DIAGNOSIS.

The modern infrequency of variola makes its recognition correspondingly difficult, especially when the eruption has been modified by previous vaccination. The well-read physician ought to be able to recognize a case of confluent or hemorrhagic smallpox, even if he had never previously seen a case, but even competent health officers go astray on cases of varioloid. Lee well sums up

the evidence necessary for the diagnosis of a case of variola in the following words:

"In smallpox the prodromal stage is always more than twenty-four hours and followed by one to two days of sharp invasion and the immediate abatement of the prodromic symptoms on the appearance of the eruption. The firm, shot-like sensation conveyed to the finger by the papules; the tendency of the eruption to appear on exposed surfaces to a greater extent than on protected surfaces; the appearance of an areola, however slight, around the vesicle; the persistence of the marks left by the falling off of the scabs for a considerable period of time, and the pigmentation of the marks; the appearance of the pustules within the mouth, on the eye, on the palms of the hands and the soles of the feet are extremely valuable corroborative symptoms."

But it should also be remembered that the eruption of smallpox is one of bewildering variations, especially with children; e. g., we may find in children cases of smallpox in which the eruption closely resembles impetigo, both in the character of the crusts, their brief duration and superficiality, and we well know varicella is prone to take on like character. The crux of our differentiation of smallpox is the ability to differentiate between discrete variola and varicella. We can be much helped in this if we remember that the crops of

vesicles in varicella are of mixed ages, that the contents of these vesicles are at first clear, and if they become sero-purulent they are superficial and do not destroy the true skin as do the pustules of smallpox.

COMPLICATIONS.

The septic complications of variola are many and often puzzling, for the ulceration of the skin and the lesions of the mucous membranes have prepared the way for the lodgment of pyogenic microbes and may give rise to parotitis, lymphangitis, erysipelas, orchitis, furnuncles, multiple abscess, or gangrene. Eye complications ranging from ulceration of the cornea to total blindness are common and so are perforations of the eardrum and deafness, edema of the glottis and perichondritis. Or the disease may be complicated by inflammation of the lungs, pleura and even pulmonary gangrene. Chronic broncho-pneumonia with symptoms resembling phthisis may be a tedious but not necessarily fatal sequela. The prognosis in complicating endocarditis, pericarditis and endoarteritis is more unfavorable. Recovery after phlegmasia alba dolens, which sometimes occurs, is very tedious.

PROGNOSIS.

The younger the child the graver the prognosis, hence congenital variola is invariably fatal.

J. Comby believes that a brief stage of invasion

betokens a grave case, but when this stage is prolonged to three and four days we may hope for a benign case and favorable results.

Complicating heart lesions, endocarditis, pericarditis, etc., add much to the danger of a case of variola. Broncho-pneumonia, or gastro-enteritis, may greatly retard recovery, but are not necessarily fatal complications. From 60 per cent to 70 per cent of unvaccinated infants and 33 per cent of all cases, not protected by vaccination die from variola.

Revaccination increases many fold the immunity of those thus protected. Statistics gathered with great accuracy in the city of Paris, prove that one in twenty of those who have had primary vaccination take smallpox, while only one in 118 of those who have been re-vaccinated contract smallpox, and of these there is only one death to 70,000 cases (Comby.)

TREATMENT.

The hard, common sense of the nineteenth century has decreed that the quarantine and treatment of smallpox should be under the direct supervision of the state, since as yet no other effective means have been devised to prevent the spread of this extremely contagious disease. Hence the first thing to be done is to report all suspicious cases to the local board of health and let them take the responsibility in the matter.

If the case is turned back upon your hands, the next thing to be done, after securing an immune or properly vaccinated nurse, is to isolate your patient in as scantily furnished room as possible, but one which admits of ventilation and is located preferably at the top of the house.

Diet should be light and mainly liquid during the entire course of the disease. Antiseptic baths should be used frequently, especially after pustulation, and of these perhaps diluted corrosive sublimate is the most efficient (Osborn), and hydrozone or dilute peroxide of hydrogen the safest. The latter may be used for the mouth, nose and eyes if required.

Chloral hydrate or chloralamid may be safely used for insomnia and smaller doses for restlessness. Phenacetin and ice bags will help the atrocious headache and backache. Begg speaks very highly of salol, after having tried the remedy largely in his Chinese practice. He claims that when given in full doses it takes away the desire to scratch and almost always prevents suppuration, the vesicles failing to mature; one confluent case producing only two pustules. He reports no dangerous effects from the use of the drug in full doses, which should be continued until the vesicles are entirely dried up.

Korman advises that each vesicle should be pricked with a gold needle, dipped in a strong

solution of nitrate of silver, and others recommend a dressing of glycerin and charcoal or iodoform. Whatever dressing is used, it should be remembered that pitting is always mildest where the skin is protected best from the action of light. Threatening septicemia should be promptly combated by the free use of quinin and alcohol and the child should on no account be allowed to escape from quarantine until the last vestiges of the smallpox scabs have disappeared and the child has had an antiseptic bath. The quarantine for French schools is 40 days; in this city it is dependent upon the intelligence of the physician in charge.

Local disinfection ought never to be committed to the family or the nurse in charge except as to the burning of every possible object used about the patient. The choice of the disinfectant and methods should be left to the local board of health and its orders implicitly obeyed, and all resulting damage should, in the opinion of the writer, be honestly paid for out of the town's revenues.

PROPHYLAXIS.

The only sure prophylaxis of smallpox is efficient vaccination. The law wisely orders that every physician should immediately report every case of smallpox coming under his observation. It ought also to be made obligatory upon every parent to report the date of the primary vaccina-

tion of each of their children with a cumulative penalty for delay. The present school law of the state is good, but it allows six years of recklessness on the part of ignorant parents and consequent danger to the rest of the community.

Unless a child is born during an epidemic of smallpox, vaccination can be deferred until it is three months old, and when properly done protects for from seven to ten years and protection begins five days after vaccination. Direct vaccination from arm to arm is rarely used except in cases of emergency, as the bovine virus is safe and efficient. Scarifying over the deltoid, until it begins to ooze serum, and rubbing the spot with the end of the ivory containing the virus, is far better than a deeper incision, as the flow of the blood often prevents the very thing it is designed to accomplish. The clothing should be kept away from the arm until the spot has entirely dried, and after this it usually requires no further attention. On the third to the seventh day the point pricked becomes reddened and slightly elevated into a nodule. A couple of days later (fifth) a clear vesicle appears on the summit of this, and soon shows umbilication, which is the time for taking lymph if direct vaccination from it is now desired. After the seventh day the vesicle transforms itself into a pustule, its contents becoming turbid and the surrounding areola redder. Often there is also

slight fever, rise of temperature, restlessness, and thirst for a day or two. About the twelfth the pustule begins to desiccate and the scab drops off, leaving an irregular, reddish cicatrix, which eventually becomes white, with fine pitting, if typical.

Vaccination does not always run the simple course here detailed, for all its symptoms may be intensified, and to them added the chill and fever of suppuration, convulsions, or even death. Urticaria and erythema are by no means infrequent with neurotic children, also eczema and ecthyma in those predisposed to scrofula, in whom sometimes the pustules obstinately refuse to heal, converting themselves into sluggish ulcers. Erysipelas may complicate when children are vaccinated in septic houses, and in such the erysipelatous inflammation may spread over the entire arm and trunk, and recovery not take place for two or three weeks. Treatment of such cases is, of course, the same as that of traumatic erysipelas otherwise produced. Syphilis is apparently the only disease which can be transmitted by vaccination, and hence the greatest care should be exercised in the selection of humanized virus, good bovine always to be preferred, and vaccination to be repeated at least as often as once in ten years and as much oftener as exposure takes place.

VALUE OF VACCINATION.

According to Brouardel, three persons out of

four, not protected by vaccination, will contract smallpox during an epidemic, and of those attacked, unvaccinated, 33 per cent will die. On the other hand, but one out of four vaccinated persons will contract varioloid under similar circumstances, and but one in twenty thus attacked die from the disease. But better than pages of arguments as to the value of the vaccination are the following cases from personal experience:

Some years since there was among my patients a family of nine, seven of whom I had properly vaccinated; of the other two, the father had been inoculated many years before with smallpox virus, and was supposed to be immune, and the youngest child was not vaccinated at the same time as the others on account of broncho-pneumonia at that time.

Some months later I was called to see two of the children for a varicella-like eruption on the hands and face. They were not ill enough to stay in bed and were without fever or backache. Unwilling to take the responsibility of a diagnosis in the case, I sent for the proper health officer, who assured me that while he did not know what the eruption was, he was absolutely sure that it was not smallpox. Nevertheless one member after another of the family contracted the disease, but none of them were seriously sick until the father and the unvaccinated babe were attacked. The

former showed a few variola pustules and the baby developed a case of confluent smallpox which cost him his eyesight and left him scarred and disfigured for life.

In other words here were nine persons presumably exposed to the same smallpox virus. Seven of them, who had been properly vaccinated, were not ill enough at any time to be confined to their beds and were not marked or injured in any way by the disease. The immunity of the father, supposed to be equal to that resulting from a case of smallpox, had become in a measure exhausted and he suffered from a mild case of varioloid. The poison that produced this in the father found virgin soil in the baby and there produced a typical case of confluent smallpox with its worst sequelae. Comment is unnecessary.

CHAPTER VIII.

LA GRIPPE.

SYNONYMS.—Epidemic influenza, Russian influenza, Tac, Horion, La dando, Coccoluche, "The New Acquaintance," Catarrhal Fever, Feveret.

DEFINITION.—A highly contagious microbic influenza differing from other forms of influenza in the violence of its onset and the persistence of its varied sequelae.

HISTORY.

According to Eloy the disease was known in Europe as early as 1173, and in Paris in 1414. It was first known under the name of *cocco luche*, or whooping cough. The disease reappeared in Paris in 1421 and this time was called *la dando*. La Grippe has appeared at infrequent intervals in different parts of Europe under various names. It was present in this country about the time of the Revolutionary war, and then disappeared from the personal knowledge of American physicians until 1890, when it swept over the entire country, via Russia. The epidemic of 1890-91-92 according to reliable statistics, produced more deaths and left more disabilities behind it than did any three years of the Civil war.

ETIOLOGY.

The relative frequency with which la grippe at-

tacks adults and children varies with the epidemic, but as a rule children, even the youngest, are not immune to this disease. The earliest account that we have of la grippe notes that it attacked "all women and most of the young." The experience of the writer is that very young children are most liable to take the disease when exposed. The statistics of the public schools of Paris during the epidemic of 1889-90 show that from 30% to 65% were absent on account of the disease and of the entire population of Paris 66% suffered from la grippe. In the epidemic at Athens in 1893, Kannelis calls attention to the fact that the disease "attacked principally children, even the newborn," and Chambrelent and Townsend report cases of la grippe contracted in utero.

Dignat considers an abnormal increase in the barometric pressure, abnormal temperature ranges, lowering of the electric influence and abnormal predominance of northern winds the meteorologic conditions that precede the appearance of epidemics of influenza.

While undoubtedly atmospheric conditions largely influence the spread and virulence of la grippe, it must not be forgotten that it is essentially a bacterial toxemia, probably due to the toxin of the Pfeiffer bacillus. The virulence of its toxin or toxins is chiefly expended on the nervous system, which accounts for the multiform mani-

festations of the disease. In addition to the systemic effect of the poison, we find the local effects of the microorganism in the nose, pharynx and respiratory mucous membrane, where we also find pyogenic bacteria and pneumococci.

PATHOLOGY.

We have, therefore, generally in la grippe, cases of mixed infection and hence the various manifestations of the disease, concerning whose bacteriology we need more definite knowledge. Babes finds a diplococcus which he believes to be the cause of la grippe, Tessier, a streptococcus, and Bouchard, Vaillard, Vincent and Finkler agree with him in the main. On the other hand, R. Pfeiffer finds a bacillus, since named for him, which is by most observers thought to be the guilty microbe.

The infection in la grippe undoubtedly enters the system by means of the respiratory passages, but leaves its lesions on almost all the organs of the body. Beginning with the nose, we find a hyperemia of the nasal passages extending to the smaller bronchioles and upward into the sinuses and middle ear; this hyperemia may be so intense as to take on a cyanotic hue and even show a grayish adherent membrane (Kormann). The stomach shows catarrhal inflammation and sometimes actual injection. A similar condition of affairs is found in Peyer's patches and the mucous

follicles of the intestines, especially well marked in the case of very young children (Herch). The lesions of the heart and larger blood vessels, while less frequent, are, according to Sansons, characteristic when found. Patches in the lining membrane of the aorta are usually observed just above the aortic cusps, or like patches may be found to encroach upon the lumen of the coronary artery.

Flesch found, in a postmortem made upon a nine weeks infant, two perforations in the small intestine and erosions of the mucous membrane in several other places. This child had been exclusively fed at the breast and these changes were not due to irritating food or drugs.

SYMPTOMS AND COURSE.

Stage of Incubation.—The incubation period of la grippe has not as yet been definitely fixed. In more than one-half of the cases, according to my personal experience, its invasion is sudden and without any premonitory symptoms. I think this is especially true of young children. In older children and adults there is sometimes observed a premonitory stage of several days, or even weeks (Castens), during which there is malaise, loss of appetite and with children a desire to remain in bed.

Symptoms of la grippe may be divided into three types, viz.: nervous, respiratory and gastro-intes-

tinal, but it should be remembered that with children these distinctions can not be sharply drawn, as the disease is often of a mixed form from the beginning, or the various types may succeed one another in the same child. Headache, earache and drowsiness are the usual initial symptoms with children. Convulsions are rare. If the child is old enough to make complaints, it will speak of wandering muscular pains in addition to headache and pain in the ears.

Fever.—Epidemic influenza has no characteristic temperature curve for children, with whom there may be a brisk, brief high temperature, or slight elevation and long continued fever. Some of these cases closely resemble typhoid in their slow progress and long continued minor oscillations, so much so that their differentiation from typhoid or incipient tuberculosis is very difficult for a while. Sweating is met with in most of the cases seen in children, especially if there has been previous high temperature. With infants drowsiness is characteristic, but the sleep is broken often by a short cry of discomfort, after which the infant settles back to sleep again. Desire for food is lost, either from the fever or because the somnolence is so great that the child is roused with difficulty to take even a sip of water.

Catarrhal symptoms, either thoracic or abdominal, are met with in a large majority of cases.

The attack usually begins with the nasal passages, which become reddened, occluded with mucus, and cause a troublesome laryngeal cough. Other cases, if the eyes are implicated, resemble measles, especially when there is added a croupy cough, and at the same time the reddening of the skin, which often is found with high fever.

These cutaneous eruptions appear in about one in every four cases and may resemble measles, urticaria, scarlatina or constitute a general redness of the whole skin, making an early diagnosis very perplexing.

As in measles, the pulmonary complications of influenza are prone to clog the bronchial lymphatics with effete products resulting in bronchial *adenitis*, which may terminate in tuberculosis. Or these enlarged glands may result in suppuration and cause septic pneumonia or pleurisy.

Gastro-intestinal catarrh may take the place of pulmonary congestion, or become associated with it in children, where there has been previous looseness of the bowels. Vomiting and purging are prominent in these cases, which may terminate rapidly and fatally, if perforation should take place. Many of these cases of intestinal catarrh are unexpectedly slow in recovery, anorexia and looseness of the bowels persisting for months in spite of your best choice of remedies. D'Astros well names one of these conditions *pseudo-typhoid*

—from the fact it is due to slow poisoning from intestinal toxins and generally perverted metabolism.

Headaches, backaches, photophobia and sharp rheumatic pains are frequent accompaniments of la grippe as seen in American children. The neuralgic form, either with localized or general pain, is what may be expected in the modern school girl, and probably the existence of like rheumatoid aches may be inferred from the pains which are manifested by infants suffering from grippe when they are moved. Convulsions, as has already been noted, are rare in infantile grippe, as the poison is depressant rather than excitant to the motor system, but initial convulsions have been noted at the onset of the disease. Sevestre describes a pseudo-meningitis as not infrequent in grippe, accompanied by the usual symptoms of tubercular meningitis, viz.: headache, vomiting, constipation, coma, stiffness of the neck, the hydrocephalic cry, irregularity of the pulse and pupils and respiration and temperature, in short all the symptoms which usually attend meningitis, but according to Corti without the existence of a true meningitis. One of the writer's cases of this kind was followed by a hydrocephalus, which still persists, leaving the child with weakened intellect. The possible complication of a true secondary meningitis, streptococcic or pneumococcic, must be

admitted, as well as the proneness of the child to develop hysteria and chorea during convalescence. It should further be remembered that the course of la grippe in the child is more irregular than with the adult, especially in the matter of convalescence. With the child, anorexia and general depression may persist for weeks after an attack of grippe lasting only for a few days and apparently mild in character. The explanation of this may doubtless be found in the fact that the influenza toxins modify nutrition, and we find this modification particularly unfavorable in the case of children predisposed to gout, or rheumatism; hence the train of lithemic symptoms which we find so long persistent after an attack of influenza in such children.

COMPLICATIONS.

Gillet well says in writing on this subject "that grippe runs over the entire gamut of possible complications, but that broncho-pneumonia is the one most frequently met with, so frequently that not a few cases of la grippe are incorrectly diagnosed as pneumonia." Influenzal pneumonias differ from acute pneumonia chiefly in the fact that they are without the high temperature which may be expected in true pneumonia, and are often attended with an amount of dyspnea, which would justify the gravest prognosis were the case one of croupous pneumonia. Or atelectasic congestion

(collapsus pulmonalis) may supervene which may be recognized by localized diminution in the pulmonary sounds, or their entire absence with diminished cough, caused by anesthesia of the bronchial mucous membrane, conjoined with a lymphatic stasis, which causes thickening of the bronchial secretions and mechanic atelectasis.

Heart complications are comparatively infrequent in children, as compared with adults, but it must be remembered that the influenza toxins seriously disturb the inhibitory apparatus of the heart. In addition to organic heart lesions, such as endocarditis and pericarditis, which are rare, we should be prepared for bradycardia, tachycardia, or arrhythmia. In the former case the pulse may run as low as 40-45. The post grippe tachycardia closely resembles Graves' disease, and like it is probably due to the action of intestinal toxins on the pneumogastric.

Arthritis, often wrongly named rheumatic, is not an infrequent complication, or sequela of la grippe. It is more closely allied to osteoarthritis than to true rheumatism, for the arthritis of influenza arises from a disturbance of the nervous system and is not accompanied with heart lesions, as is true rheumatism. Moreover these attacks are also frequently attended with increased uric acid excretion.

The especial affinity of the toxins of influenza

for the nervous system renders it very liable to functional nervous diseases during convalescence. Chief among these may be mentioned hysteria and chorea with various pseudo-paralyses and possibly localized sclerosis of the spinal cord.

Michaelis reports a case of influenza in a boy age 13 years, in whom recovery was followed by paralysis of the legs, which became spastic and could be separated only with difficulty. The right foot was in the position of equinovarus. Muscular twitchings were apparent as soon as the boy laid down. Sensation was normal and the patellar reflexes greatly exaggerated, while all the others were normal. In this case recovery took place in about two months.

Sciatica is not infrequent in children with a previous rheumatic history. All children suffering coincidently from rheumatism will have their rheumatic troubles increased during la grippe.

Suppurative parotitis is noted by Flesch and all observers are acquainted with the great frequency of aural troubles and their tedious recovery.

DIFFERENTIATION.

During the prevalence of la grippe one is very prone to consider every case of pharyngitis, coryza or bronchitis coming under observation as a case of la grippe, or at least unfavorably influenced by the prevalent epidemic. It may help us to a more accurate diagnosis if we remember that the

characteristic symptom of true grippe is its effects upon the nervous system and the systemic depression produced thereby.

Phillips describes what he considers a pathognomonic sign of influenza. It consists of congestion of the greater part or the whole of the faucial arch, including usually the uvula and the posterior part of the soft palate, the whole area of congestion being indicated by increased redness. The dilation or relaxation of the capillaries and of the smaller vessels of the mucous membrane generally is sometimes extreme, and not infrequently arborescent venules are plainly visible, especially about the base of the uvula. The distinguishing feature of this affection is a narrow patch of superficial ulceration on the edge of the anterior pillars of the fauces on both sides; it is symmetrical, and the ulceration is evidently due primarily to desquamation of the epithelium during the attack. This symptom of influenza may sometimes persist for months or even years. It is entirely painless.

Bacteriological experts will undoubtedly sooner or later be able to furnish as accurate and early diagnosis in grippe as has already been accomplished in diphtheria, but as the French say, bacteriology has not yet arrived.

PROGNOSIS.

The physician who attempts to predict the probable duration of a given case of la grippe

in a child lacks wisdom or experience. It is a disease whose outcome is largely dependent upon possible complications and these complications are so varied and serious that the best that can be done is to hope that the disease will run an uncomplicated course of about two weeks, and be prepared for any complication known.

The danger of fatal results in la grippe varies in children, greatly, with the epidemic and also with the time of the epidemic in which they contract the disease; but at any time the mortality in grippe for young children is very high (Gillet). The depressing influence of the grippe toxin on the thermogenetic centers has already been referred to, a fact that should be kept in mind, since the temperature in la grippe is of little value either in the way of diagnosis or prognosis. Complicating otitis adds much to the danger of the case both during the acute stage and from later possible meningeal complication or post mastoid abscess.

We are furthermore justified in giving an unfavorable prognosis whenever there is an intensification of nervous symptoms or serious gastrointestinal disturbances, especially in nursing children. The rachitic, scrofulous and tuberculous are those liable to succumb most rapidly to the disease. The danger to life from syncope is relatively greater in complicating bradycardia than in either tachycardia or arrhythmia (Lauson).

An unfavorable prognosis should be made in cases complicated by previous rheumatic heart troubles, which are greatly aggravated by the poison of influenza.

TREATMENT.

Prophylaxis has not yet accomplished much, although sulphate of quinin is said to be deadly to the bacillus of Pfeiffer, generally supposed to be the cause of the disease. On the other hand, the use of quinin during any stage of the disease is violently opposed by many writers.

Despres recommends the use of sprays of chloroform water (5 to 1,000), but without corroborating reports from others. On purely theoretical grounds the use of an antiseptic spray in the nose and gargle for the throat ought to be of advantage. The use of a warm saturated solution of boracic acid or normal salt solution followed by inunction of the nasal passages with mentholated vaseline (1:10) has been advised. Hydrozone is recommended for the same purpose.

Flesch believes that infants can safely continue to nurse mothers suffering from the gripe, but that the same children will contract the disease if fed from a bottle, or by a spoon and cup used by the mother.

Medicinal.—The medicinal treatment consists largely in the anticipation of complications or the neutralization as far as possible of the gripe

poisons. Elimination of these through the skin and kidneys can usually be best accomplished, and when the disease is seen in its earliest stages much comfort can be given the child by the use of the following:

R. Liq. ammon acetatis.

Vin. mariani, aa.....oz. 2

One teaspoonful in hot, sweetened water or lemonade every 2 hours.

For the later muscular aches and pains lactophenin and salol (2+1) have been found very efficient and without depressing after effects. The pulmonary symptoms need prompt stimulation from the first; ammonium carbonate and tincture nux vomica given in small and frequently repeated doses have been the writer's favorites.

When bronchial adenitis is suspected, the syrup of the iodid of iron is clearly indicated, and Bartholow speaks highly of the same where depression is great and long continued. In some cases of arrhythmia and tachycardia sulphate of spartein (gr. $\frac{1}{8}$ - $\frac{1}{4}$) has proved exceedingly useful and where angina pectoris appears nitroglycerin or nitrite of amyl will give promptest relief. Bartholow recommends sulphate of atropin hypodermically for sudden heart failure. Digestion must be carefully looked after if paroxysmal tachycardia is to be prevented. Consultation with a specialist in

ear troubles should be insisted upon very early in the disease, where there is earache.

The specific directions for the treatment of tardy convalescence can not be detailed here. The writer wishes simply to note that in his opinion success is dependent as much upon assisting elimination in these cases as upon choice of diet and care in feeding.

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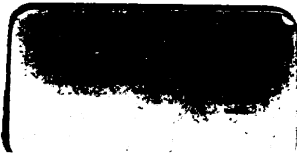
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